User Guide

Fiber Optic Matrix Switchers

FOX Matrix 320x, FOX Matrix 14400

Configurable Fiber Optic Digital Matrix **Switchers**

Extron Electronics
INTERFACING, SWITCHING AND CONTROL

68-1539-02 Rev. A
02 14

Safety Instructions

Safety Instructions • English

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Korean

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. The Class A limits provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference. This interference must be corrected at the expense of the user.

ATTENTION: The Twisted Pair Extension technology works with unshielded twisted pair (UTP) or shielded twisted pair (STP) cables; but, to ensure FCC Class A and CE compliance, STP cables and STP Connectors are required.

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Conventions Used in this Guide

Notifications

The following notifications are used:

WARNING: A warning indicates a situation that has the potential to result in death or severe injury.

ATTENTION: Attention indicates a situation that may damage or destroy the product or associated equipment.

NOTE: A note draws attention to important information.

TIP: A tip provides a suggestion to make working with the application easier.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
```

```
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

Esc X13 *X18* X26* X29* X27 CE ←

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "O" represents the capital letter "o."

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
```

```
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx –t
```

```
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

Specifications Availability

Product specification are available on the Extron website, **www.extron.com**.

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Introduction

WARNING: Risk of serious physical injury — The FOX matrix switchers fiber optic I/O boards output continuous invisible light that may be harmful to the eyes. Use with caution.

- **Do not look** into the fiber optic cable connectors or into the fiber optic cables.
- Plug the attached dust caps into the optical transceivers when the fiber cable is unplugged.

- About this Guide
- About the FOX Matrix Switchers
- Definitions
- Features

About this Guide

This guide contains installation, configuration, and operating information for the Extron FOX Matrix 320x Switcher and FOX Matrix 14400 Switcher. These customizable matrix switchers support up to 320 (FOX Matrix 320x) or 144 (FOX Matrix 14400) inputs and outputs.

NOTE: In this guide, "FOX matrix switcher" and "switcher" refer to either switcher model unless otherwise specified.

About the FOX Matrix Switchers

The FOX matrix switchers (see **figure 1**, on the next page, for a FOX Matrix 14400 example) distribute optical and electronic input signals to one or more optical and electronic outputs. The matrix switchers can route multiple input/output configurations simultaneously. The switchers are configurable, assembled from individual input/output (I/O) boards, each of which supports 16 inputs by 16 outputs in a combination of the following types of board:

- **Singlemode and multimode fiber optic 16x16 I/O boards** — These non-pathologically-compliant fiber optic boards route signals that are compatible with all Extron FOX 500, FOXBOX, and PowerCage FOX fiber optic product lines.
- **FOX 3G I/O 1616 SM P board** — This pathologically-compliant fiber optic board passes digital signals in broadcasting applications, while addressing the compatibility issues of passing pathological signals generated from 3G-SDI, HD-SDI, and SDI signals over fiber optic systems.
- **BNC 3G/HD/SD-SDI 16x16 I/O board** — This pathologically-compliant board supports and passes 3G-SDI, HD-SDI, and SD-SDI signals in their native (electronic) format.

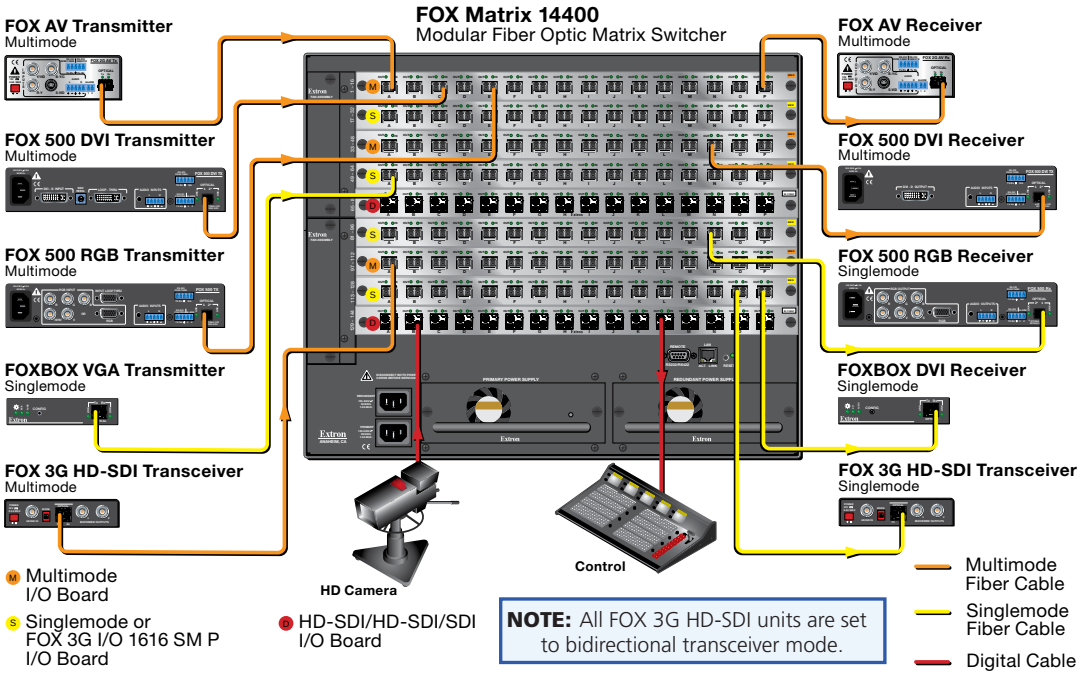


Figure 1. Typical FOX Matrix 14400 Application

NOTE: The non-pathologically-compliant multimode and singlemode fiber optic I/O boards are physically and functionally identical, with the exception of the effective range of transmission. In this guide, any reference to fiber optic transmission applies to either transmission mode unless otherwise specified. The pathologically-compliant fiber optic I/O board is identified separately where appropriate.

By adding or removing I/O boards, the FOX matrix switcher is expandable and contractable within the following ranges:

- **FOX Matrix 320x** — Includes up to 20 I/O boards. It is expandable from a 16-input by 16-output matrix to a 320-input by 320-output matrix.
- **FOX Matrix 14400** — Includes up to 9 I/O boards. It is expandable from a 16-input by 16-output matrix to a 144-input by 144-output matrix.

The Extron proprietary fiber optic signal, generated by FOX 500, FOXBOX, PowerCage FOX, and FOX II transmitters, can include video, stereo audio, and transmitter-to-receiver RS-232 serial communications. The video component of the signal can be of a variety of formats, depending on the transmitter and receiver:

- RGB video
- 3G-SDI, HD-SDI, or SDI video
- Digital Visual Interface (DVI) video
- Low resolution (composite video or S-video)

NOTES:

- Compatible optical signals are digital signals from 270 Mbps through 4.25 Gbps that are sent and received via fiber optic small form factor pluggable (SFP) modules with LC-type connectors. The FOX matrix switchers support all compatible optical signals, whether transmitted or received by an Extron fiber optic system component or not.
- The FOX 500, FOXBOX, and PowerCage FOX transmitter-to receiver communications, including the serial link, occupy one matrix switcher input and output. This matrix switcher also supports the FOX 500 return (receiver-to-transmitter) serial communications, but returning this signal stream to the transmitter occupies a separate matrix switcher input and output.

The matrix switchers input and output the optical signals that they route on fiber optic transceiver modules and the 3G-SDI, HD-SDI, and SDI video signals on BNC connectors.

The switcher has four (FOX Matrix 320x) or two (FOX Matrix 14400) internal, hot-swappable, 100 VAC to 240 VAC, 50-60 Hz, 400-watt power supplies that provide worldwide power compatibility and reliability.

The matrix switcher is a single box solution to complex fiber optic and broadcast signal routing applications. Each input and output is individually isolated and buffered. Any input can be switched to any one output or all outputs with virtually no crosstalk or signal noise between channels.

The matrix switcher can be remotely controlled using either the Extron Matrix Switchers Control Program or the Simple Instruction Set (SIS). Control is available via:

- A rear panel Remote RS232/RS422 port
- A rear panel LAN port
- **FOX Matrix 320x** — A front panel mini USB Config (configuration) port
- **FOX Matrix 14400** — A front panel RS-232 serial Config (configuration) port

The SIS is a set of basic ASCII code commands that provide simple control through a control system or PC without the need to enter long strings of code. SIS commands can be entered via any of the ports listed above.

The switcher can be operated remotely by any of the following connected to a serial port or LAN port:

- A control system
- A PC
- An Extron MKP 2000 remote control panel
- An Extron MKP 3000 remote control panel
- (**RS-232 or RS-422 only**) An Extron MCP 1000 remote control panel, an MKP 1000 remote keypad, or both

The matrix switcher is housed in a rack-mountable, metal enclosure with mounting flanges for standard 19-inch racks. The sizes are as follows:

- **FOX Matrix 320x** — 17U high
- **FOX Matrix 14400** — 9U high

Fiber Cable Transmission Modes

Two versions of the non-pathologically compliant FOX matrix switcher fiber optic I/O board are documented in this guide. They are categorized by the type of fiber optic cable, multimode or singlemode, which defines the effective range of transmission:

- **Multimode** — Long distance, up to 300 m (985 feet)
- **Singlemode** — Very long distance, up to 30 km (18.75 miles)

NOTES:

- All transceiver modules on a fiber optic I/O board, as delivered from Extron, are configured the same: either all multimode or all singlemode.
- You can mix multimode and singlemode fiber optic I/O boards in a FOX matrix switcher, but you must ensure that you connect the proper transmission mode fiber cables to the board.

Definitions

The following terms, which apply to all Extron matrix switchers, are used throughout this guide:

Tie — An input-to-output connection.

Set of ties — An input tied to two or more outputs. (An output can never be tied to more than one input.)

Configuration — One or more ties or one or more sets of ties.

Current configuration — The configuration that is currently active in the switcher (also called "configuration 0").

Global memory preset — A configuration that has been stored. Up to 64 global presets can be stored in memory. When a preset is retrieved from memory, it becomes the current configuration. Presets can be saved and recalled via any of the serial ports or the LAN port.

Room — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 rooms, each of which can consist of from 1 to 16 outputs.

Room memory preset — A configuration consisting of outputs in a single room that has been stored. When a room preset is retrieved from memory, it becomes the current configuration. Up to 10 room presets can be associated with a room.

Features

Fiber optic inputs and outputs — With fiber optic I/O boards, the switchers input and output fiber optic signals on SFP optical connectors. The fiber optic I/O boards support digital signals from 270 Mbs through 4.25 Gbps.

SDI, HD-SDI, or 3G-SDI inputs and outputs — With SDI/HD-SDI I/O boards, the switchers input and output SDI and HD-SDI signals on BNC connectors. The SDI/HD-SDI I/O boards support multi-rate SDI at rates up to 2.97 Gbps, and comply with SMPTE 259M-C, 292M, 424M, and ITU digital video standards.

Cross-format compatibility —

- An input on an SDI/HD-SDI I/O board can be tied to an output on a fiber optic I/O board.
- An input on a fiber optic I/O board can be tied to an output on an SDI/HD-SDI I/O board.

Switching flexibility — The switcher provides individually buffered, independent matrix switched outputs.

- **Any input can be tied to any or all outputs.**
- **Quick multiple tie** — Multiple inputs can be switched to multiple outputs simultaneously. This allows all displays (outputs) to change from source to source at the same time.

Input link detection — In critical environments or unmanned, remote locations, it may be vital to know that sources are active and switching. The switcher confirms that input sources are active by detecting light. Link detection provides instantaneous feedback via the serial ports of the switchers or local-area network (LAN) port. The input information can be displayed on any control system or in a control program on a LAN or Internet (IP) connection.

Rooming — The switcher can be programmed to group multiple outputs to specific "rooms," allowing them to have their own presets.

Operational reliability — The FOX matrix switcher can support round-the-clock operation in mission-critical applications, using a combination of hot-swappable components and redundant power supplies.

- **Field upgradable, hot-swappable modular design** — You can repair, upgrade, reconfigure, or expand the matrix by simply installing a new I/O board or replacing a board of one type with one of another. Hot-swappable components let you replace any I/O board at any time without powering down the switcher.
- **Primary and redundant, hot-swappable power supplies** — The hot-swappable, externally mounted redundant power supply is configured to automatically take over the load from the primary supply in the case of a failure.

  The complete power circuit, from the plug, through the power supply, to the insertion of the power onto the power distribution plane, is separate and redundant (see figure 2). If the installation includes uninterruptible or completely separate power sources, the switcher remains powered up through any power interruption except a simultaneous loss of power on both power sources.

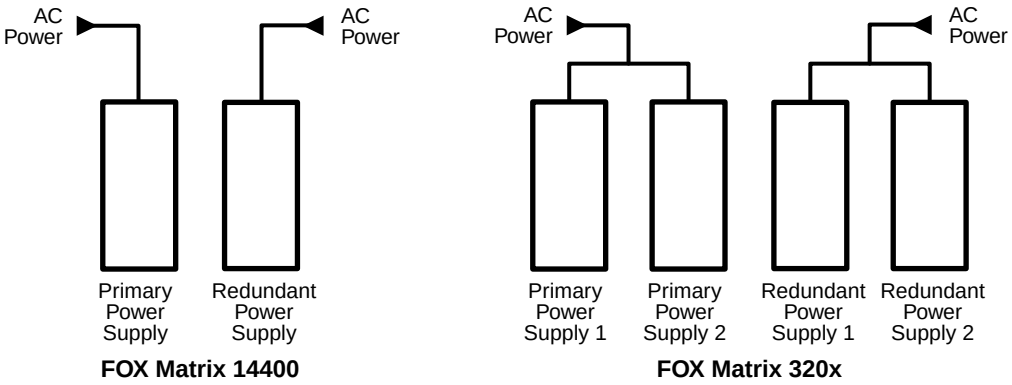


Figure 2. Redundant Power Supply Backs up Primary

  The hot-swappable redundant power supply means no downtime for the switcher and no loss of functionality should one power supply fail. Should a primary power supply fail, the redundant power supply immediately assumes the load of the failed primary supply. A failed power supply is easily replaceable from the rear at any time without powering down the matrix and with no tools required.

- **Ease of maintenance** — A failed power supply can be easily replaceable from the rear at any time without powering down the matrix, and with no tools required.
- **Power supply status LEDs** — Front panel and rear panel LEDs indicate the status of the primary and redundant power supplies.
- **Hot-swappable fans** — The hot-swappable, externally mounted fans allow quick replacement to avert overheating in the case of a failure. Fans can be replaced without powering down the switcher.

Operational flexibility — Operations such as input and output selection and setting of presets can be performed via the Ethernet port or either serial port. The serial ports allow remote control via a PC or a control system. The Ethernet link allows multiple remote links with two levels of password protection.

- Windows-based Matrix Switchers Control Program
- Simple Instruction Set (SIS)
- Remote control panels and keypads

SNMP support for remote monitoring — Supports the Simple Network Management Protocol (SNMP) internet-standard protocol, allowing IT personnel to manage devices on the IP network.

Laser controls — Non-pathologically compliant fiber optic boards can be set, via SIS commands, to individually or globally disable the output laser drivers so that a driver does not output light. They can also be set, individually or globally, to automatic so that a driver turns on when a tie is made involving that driver or off when no tie is made.

Upgradeable firmware — The firmware that controls all switcher operation can be upgraded in the field via either serial port or the Ethernet port, without taking the switcher out of service. Firmware upgrades are available for download at **www.extron.com**, and can be installed using the Matrix Switchers Control Program or the built-in HTML pages.

Global memory presets — 64 global memory presets are a time-saving feature that lets you set up and store input/output configurations in advance. You can then recall those configurations when needed, with a few simple steps, via serial port or Ethernet control.

Rack mounting — Rack mountable in any conventional 19-inch wide rack.

Permanent, rechargeable battery — The matrix switcher has a rechargeable lithium battery to track time of day when power is disconnected.

WARNING: Explosion hazard — Service note to Extron personnel: There is a danger of explosion if the battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the instructions of the manufacturer.

ATTENTION: Non-Extron personnel must not attempt to remove the battery. Doing so will void the warranty.

Installation

This section details the installation and configuration of the FOX Matrix Switchers, including:

- **Setup and Installation Checklist**
- **Rear Panel Boards, Cabling, and Features**
- **Front Panel Features**
- **Reset Operations**

Setup and Installation Checklist

Get Ready

- ☐ Familiarize yourself with the matrix switcher.
- ☐ Obtain IP setting information for the matrix switcher from the local network administrator. Read **Ethernet Connection**, beginning on page 82.

Configure the Matrix Switcher

- ☐ Install the desired I/O boards (**page 75**).

Perform Physical Installation

- ☐ If desired, install the switcher in a rack (**page 74**).
- ☐ Cable input and output devices to the I/O ports (**page 11**).
- ☐ As desired, connect computers, control systems, or both to the rear panel Remote port (**page 13**), LAN port (**page 14**), and front panel Configuration port (**page 16**).
- ☐ Connect power (**page 15**).
- ☐ Test the switcher by creating a tie (**page 25**).

Install Software

- ☐ Install the Matrix Switchers Control Program (**page 38**).

Rear Panel Boards, Cabling, and Features

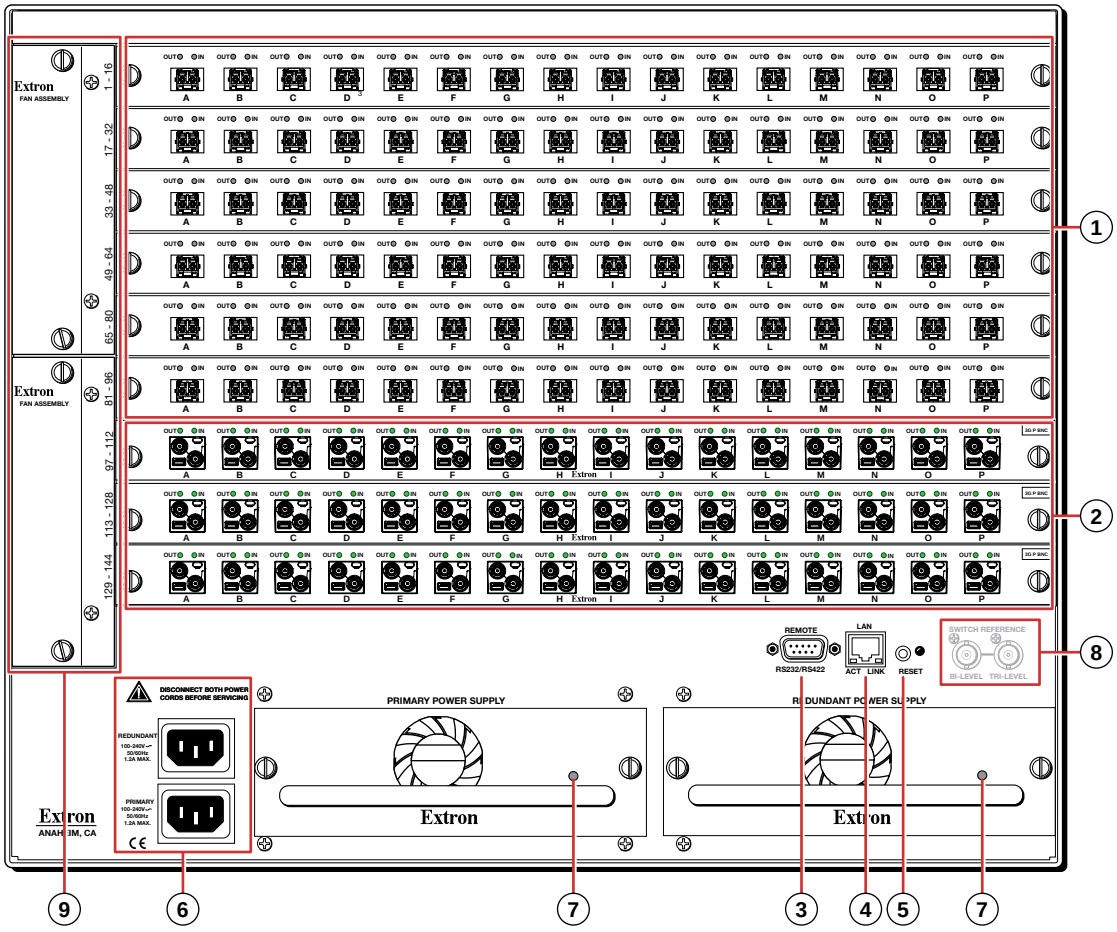


Figure 3. FOX Matrix 14400 Switcher Rear Panel

① **Fiber optic boards with connectors and LEDs** (see **page 11**)

② **3G-SDI, HD-SDI, and SDI boards with connectors and LEDs** (see **page 12**)

③ **Remote RS232/RS422 port** (see **page 13**)

④ **LAN connector (Ethernet connection)** (see **page 14**)

⑤ **Reset button and LED** (see **page 15**)

⑥ **Primary and Redundant AC power connectors** (see **page 15**)

⑦ **Power supply modules and indicator LEDs** (see **page 15**)

⑧ **Switch Reference BNCs** — Present but not used on the FOX Matrix 14400. Not present on the FOX Matrix 320x.

⑨ **Cooling fan assemblies** (see **Removing and Installing a Fan Module** on page 80)

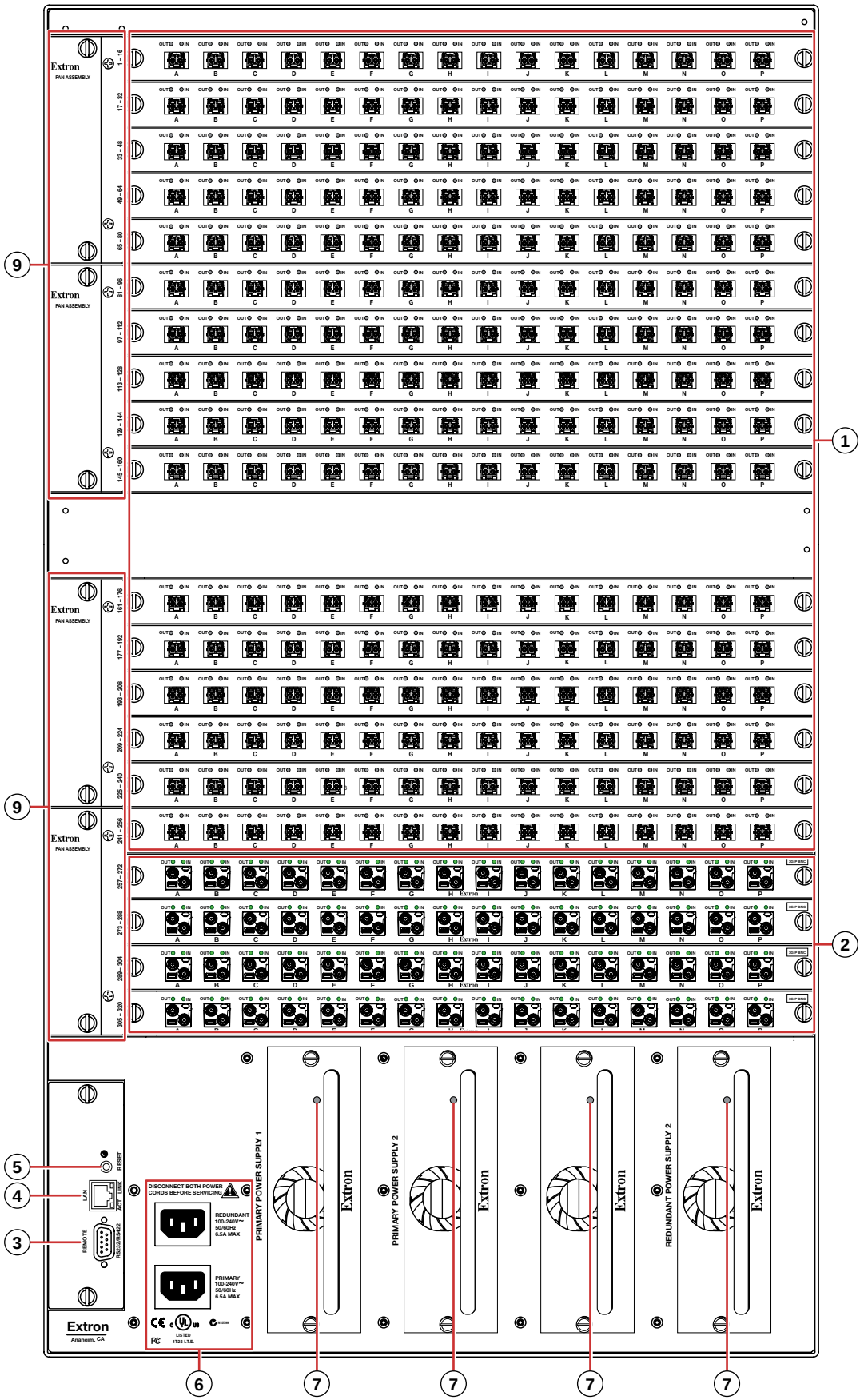


Figure 4. FOX Matrix 320x Switcher Rear Panel

ATTENTION:

- Use electrostatic discharge (ESD) precautions (be electrically grounded) when making connections. Electrostatic discharge can damage equipment, even if you cannot feel, see, or hear it.
- Remove system power before making all connections.

I/O Boards

As shown in figure 5, each I/O board is identified by the input and output numbers supported by the board position, which are printed on the side of each fan module (1 - 16, 17 - 32, and so on). The transceiver modules on fiber optic I/O boards and BNC bocks on the 3G/HD/SD-SDI are identified as A through P.

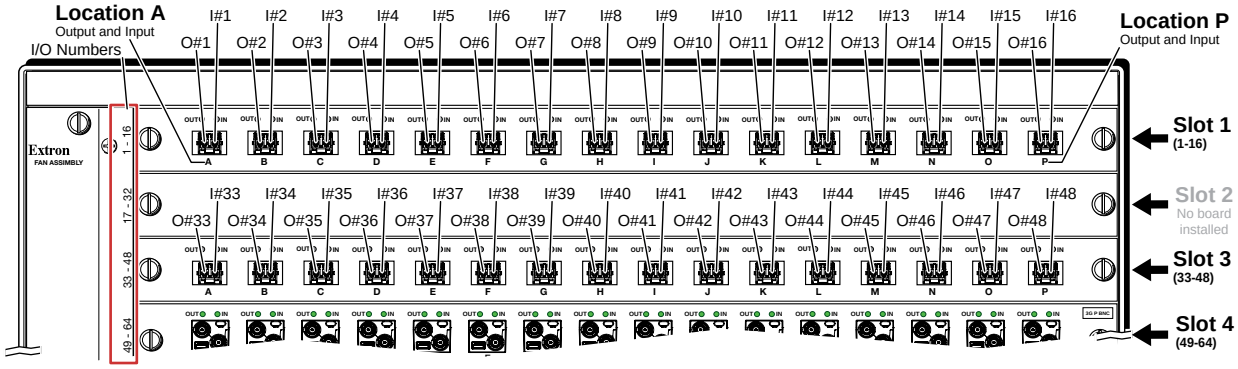

Location A
Output and Input
I/O Numbers
I#1 I#2 I#3 I#4 I#5 I#6 I#7 I#8 I#9 I#10 I#11 I#12 I#13 I#14 I#15 I#16
O#1 O#2 O#3 O#4 O#5 O#6 O#7 O#8 O#9 O#10 O#11 O#12 O#13 O#14 O#15 O#16
Location P
Output and Input
Extron
FAN ASSEMBLY
1 - 16
17 - 32
33 - 48
49 - 64
A B C D E F G H I J K L M N O P
I#33 I#34 I#35 I#36 I#37 I#38 I#39 I#40 I#41 I#42 I#43 I#44 I#45 I#46 I#47 I#48
O#33 O#34 O#35 O#36 O#37 O#38 O#39 O#40 O#41 O#42 O#43 O#44 O#45 O#46 O#47 O#48
Slot 1
(1-16)
Slot 2
No board installed
Slot 3
(33-48)
Slot 4
(49-64)

Figure 5. Arrangement of Inputs and Outputs on the I/O Boards

Each module, numbered from left to right, includes one of the outputs and one of the inputs supported by the board. (For example, the input and output numbers supported by the I/O board in location 33 - 48 [slot 3] are as follows: A = 33, B = 34, C = 35, D = 36, E = 37, F = 38, G = 39, H = 40, I = 41, J = 42, K = 43, L = 44, M = 45, N = 46, O = 47, and P = 48.)

NOTE: The output on the transceiver module is to the *left* of the input.

Slot	Inputs and Outputs	Slot	Inputs and Outputs
1	1 through 16	11*	161 through 176
2	17 through 32	12*	177 through 192
3	33 through 48	13*	193 through 208
4	49 through 64	14*	209 through 224
5	65 through 80	15*	225 through 240
6	81 through 96	16*	241 through 256
7	97 through 112	17*	257 through 272
8	113 through 128	18*	273 through 288
9	129 through 144	19*	289 through 304
10*	145 through 160	20*	305 through 320

* FOX Matrix 320x only

Fiber optic boards

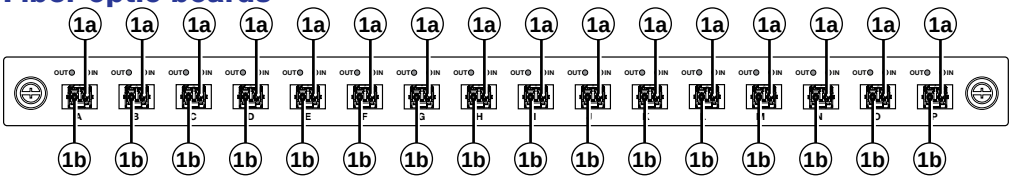


Figure 6. Fiber Optic Board

① **Fiber optic board, connectors** (see **figure 3** on page 8 and **figure 4** on page 9)—

WARNING: **Risk of serious physical injury** — The FOX matrix switchers fiber optic I/O boards output continuous invisible light, which may be harmful to the eyes; use with caution.

- **Do not look** into the fiber optic cable connectors or into the fiber optic cables.
- Plug the attached dust caps into the optical transceivers when the fiber cable is unplugged.

NOTES:

- Ensure that you use the proper fiber cable for your I/O board. Typically, singlemode fiber has a yellow jacket and multimode cable has an orange or aqua jacket.
- Unlike most Extron transmitters and receivers, which output an optical stream on one connector in a block and receive a return optical stream on the second connector in the same block, the FOX matrix switchers uses one connector on the block as an input and the second connector on the same block as a separate output.
- All transceiver modules on a fiber optic I/O board, as delivered from Extron, are configured the same: either all multimode or all singlemode.
- You can mix multimode and singlemode fiber optic I/O boards in a FOX matrix switcher, but you must ensure that you connect the proper transmission mode fiber cables to the board.

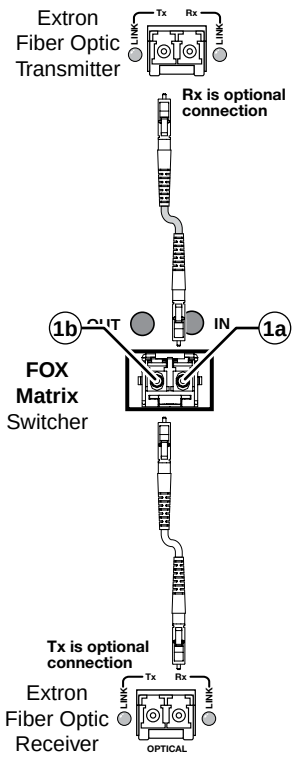


Figure 7. Optical Connections

①a **Input connector and LED** — For all one-way video, audio, and serial communications output by a transmitter, connect a fiber optic cable to the Input LC connector (see figure 7).

Connect the far end of this fiber optic cable to the Optical Tx LC connector on a FOXBOX Tx transmitter or to any other compatible Extron fiber optic device.

NOTES:

- For a FOX 500 transmitter, connect this fiber optic cable to the Optical 1 LC connector.
- **Alternatively**, for the serial return, (receiver-to-transmitter) function, connect the far end of the cable to the Optical 2 connector on a receiver.

Input LED — See **Fiber optic I/O board LED indications** on the next page.

⑯ **Output connector —** For all one-way video, audio, and serial communications output to a receiver, connect a fiber optic cable to the Output LC connector (see **figure 7**, on the previous page).

Connect the far end of this fiber optic cable to the Optical Rx LC connector on a FOXBOX Rx receiver or to any other compatible Extron fiber optic device.

NOTES:

- For a FOX 500 receiver, connect this fiber optic cable to the Optical Rx LC connector.
- **Alternatively**, for the serial return, (receiver-to-transmitter) function, connect the far end to the Optical 2 connector on a transmitter.

Output LED — See "Fiber optic I/O board LED indications," below.

Fiber optic I/O board LED indications

On the fiber optic I/O boards, the input and output LEDs on the transceivers provide useful indications of the status of the lasers and the reclocking function. See the table below.

Definition	OUT ● IN Output LED indication	Input LED indication	Definition
Reclocked at 4.25 Gbps	On	On	Reclocked at 4.25 Gbps
Not reclocked, laser off, or no signal	Off	Off	Not reclocked or no signal
Non-4G signal present or not reclocked	Fast blink	Fast blink	Non-4G signal present or not reclocked

3G/HD/SD-SDI boards

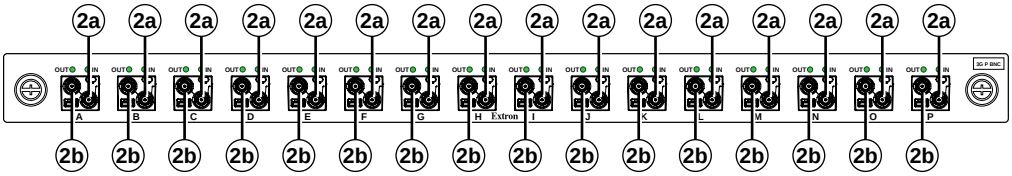
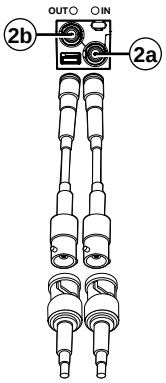


Figure 8. 3G/HD/SD-SDI Board



② **BNC board, connectors** (see **figure 3** on page 8 and **figure 4** on page 9) — Connect inputs and output using the included DIN-to-female-BNC pigtail connectors, as follows:

NOTE: The pigtails are not installed on the board during shipment.

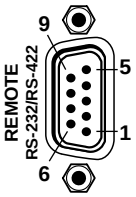
- **To install the pigtails**, press them onto the DIN connectors until they snap into place.
- **To remove the pigtails**, pull back on the knurled collar and pull the pigtail straight back from the DIN connector.

⑫ **Multi-rate SDI Input connectors** — Connect 3G-SDI, HD-SDI, or SDI video inputs to these BNC connectors.

⑫ **Multi-rate SDI Output connectors** — Connect digital displays to these BNC connectors.

Remote Port

③ **Remote RS232/RS422 connector** (see **figure 3** on page 8 and **figure 4** on page 9) — Connect a host device, such as a computer or touch panel control, to the switcher via this 9-pin D connector for serial RS-232 or RS-422 control (see figure 9).



Pin	RS-232	Function	RS-422	Function
1	—	Not used	—	Not used
2	Tx	Transmit data	Tx–	Transmit data (–)
3	Rx	Receive data	Rx–	Receive data (–)
4	—	Not used	—	Not used
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	Rx+	Receive data (+)
8	—	Not used	Tx+	Transmit data (+)
9	—	Not used	—	Not used

Figure 9. Remote RS232/RS422 Connector

See **Programming Guide**, beginning on page 20, for definitions of the SIS commands (serial commands to control the switcher via this connector) and **Matrix Software**, beginning on page 36, for details on how to install and use the control software.

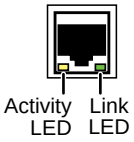
NOTE: The switcher can support either the RS-232 or the RS-422 serial communication protocol, and can operate at 9600, 19200, 38400, or 115200 baud rates.

See the **Command and Response Table for IP- and SNMP-Specific SIS Commands** on page 33 to configure this port under SIS control.

If desired, connect an MKP 2000 or MKP 3000 remote control panel to the Remote RS232/RS422 connector. See the *MKP 2000 Remote Control Panel User Guide* or the *MKP 3000 User Guide* for details.

Ethernet Connection

④ **LAN port** (see **figure 3** on page 8 and **figure 4** on page 9) — For IP control of the system, connect the matrix switcher to a PC or to an Ethernet LAN via this RJ-45 connector. You can use a PC to control the networked switcher with SIS commands from anywhere in the world. You can also control the switcher from a PC that is running the Extron Matrix Switchers Control Program or has downloaded HTML pages from the switcher.



Link LED indicator — The green (link) LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily.

Act LED indicator — The yellow (activity) LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

Cabling

It is vital that your Ethernet cables be the correct cable type and that they be properly terminated with the correct pinout. Ethernet links use Category (CAT) 3, 5e, or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length of 328 feet (100 meters).

NOTES:

- Do not use standard telephone cables. Telephone cables do not support Ethernet or Fast Ethernet.
- Do not stretch or bend cables. Transmission errors can occur.

The cable used depends on your network speed. The switcher supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex Ethernet connections.

- 10Base-T Ethernet requires CAT 3 UTP or STP cable at minimum.
- 100Base-T Fast Ethernet requires CAT 5e UTP or STP cable at minimum.

RJ-45 connector wiring

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (see figure 10).

- **Crossover cable** — Direct connection between the computer and the FOX matrix switcher
- **Patch (straight) cable** — Connection of the FOX matrix switcher to an Ethernet LAN

Crossover Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown
	T568A	T568B

A cable that is wired as T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

Straight-through Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-orange	White-orange
2	Orange	Orange
3	White-green	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Green	Green
7	White-brown	White-brown
8	Brown	Brown
	T568B	T568B

A cable that is wired the same at both ends is called a "straight-through" cable, because no pin/pair assignments are swapped.

Figure 10. RJ-45 Connector and Pinout Tables

Reset Button and LED

⑤ **Reset button** (see **figure 3** on page 8 and **figure 4** on page 9) — The recessed Reset button initiates four levels of matrix switcher reset. For four different reset levels, press and hold the button while the switcher is running or while you power up the switcher (see **Reset Operations** on page 18 for details).

- **Events (mode 3) reset** — Toggles events monitoring on and off.
- **IP settings (mode 4) reset** — Reset the IP functions of the switcher.

> **NOTE:** The IP settings reset does not replace any user-installed firmware.

- **Absolute (mode 5) reset** — Restore the switcher to the default factory conditions.
- **Hard reset** — Restore the switcher to the default factory conditions and return the switcher to the default firmware that shipped with the unit.

> **NOTES:**
> - Factory loaded firmware is active until it is replaced or the power is cycled.
> - Hard reset does not clear the current configuration.

Power Supply Modules and Indicator LEDs

⑥ **Primary and Redundant AC power connectors** (see **figure 3** and **figure 4**) — Plug standard IEC power cords into these connectors to connect the switcher to 100 VAC to 240 VAC, 50 or 60 Hz power sources.

> **NOTE:** For the most reliable power, connect the a power cord from the Redundant power connector to either an uninterruptible power source or to a power source that is completely independent from the primary power source.

⑦ **Primary and Redundant power supply indicator LEDs** (see **figure 3** and **figure 4**) —

Green — Indicates that the associated power supply is operating within normal tolerances.

Red — Indicates that the associated power supply is operating outside the normal tolerances or has failed. See **Removing and Installing a Power Supply Module** on page 78 to replace the power supply.

Cooling Fan assemblies

⑨ **Primary and Redundant cooling fans** (see **figure 3** and **figure 4**) — Cool the equipment. If a fan has failed, replace it at your earliest opportunity. See **Removing and Installing a Fan Module** on page 80 to replace the fans.

Front Panel Features

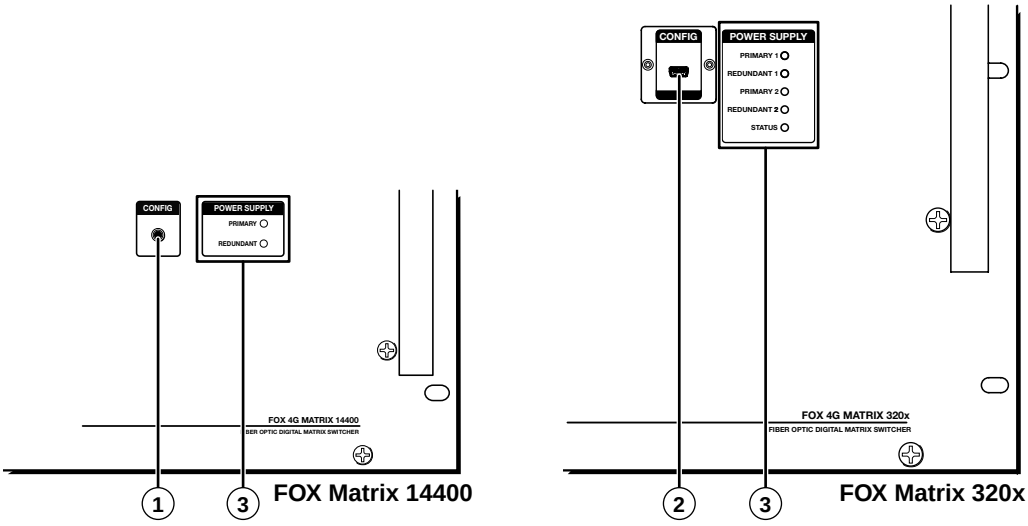
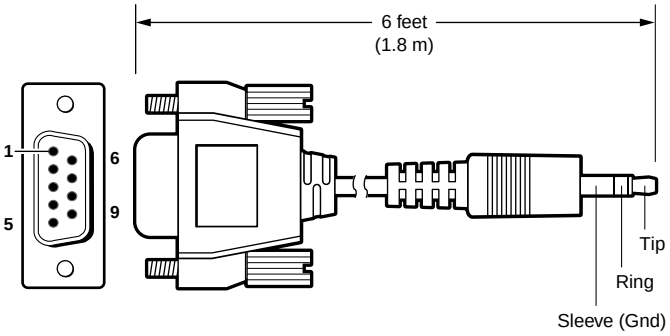


Figure 11. Front Panel Configuration Port

① **Configuration port (FOX Matrix 14400 only)** — This 2.5 mm mini stereo jack serves the same serial communications function as the rear panel Remote port (although RS-232 only), but it is easier to access than the rear port after the matrix switcher has been installed and cabled. The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable (see figure 12), can be used for this connection.



9-pin D	Connection	TRS Plug
Pin 2	Rx line on the computer	Tip
Pin 3	Tx line on the computer	Ring
Pin 5	Signal ground on the computer	Sleeve

Figure 12. Optional 9-pin TRS RS-232 Cable

NOTES:

- This port is independent of the rear panel Remote port and is not affected by changes to the protocol of the rear panel port. This front panel port protocol can be changed under SIS command control only. See the **Serial Ports Parameters** SIS command on page 34 to configure this port under SIS control.
- A front panel Configuration port (RS-232) connection and a rear panel Remote port connection can both be active at the same time.

This port is RS-232 only, with its default protocols as follows:

- 9600 baud
- 1 stop bit
- no parity
- no flow control
- 8 data bits

NOTE: The maximum distance from the matrix switcher to the controlling device can be up to 200 feet (61 meters). Factors such as cable gauge, baud rates, environment, and output levels (from the switcher and the controlling device) all affect transmission distance. Distances of about 50 feet (15 meters) or less are typically not a problem. In some cases the matrix switcher may be capable of serial communications via RS-232 up to 250 feet (76 meters) away.

② **Configuration port (FOX Matrix 320x only)** — A mini USB B port.

③ **Power Supply and Status LEDs** —

Primary and Redundant Power Supply LEDs —

- **Green** — Indicates that the associated power supply is operating within normal tolerances.
- **Amber (FOX Matrix 320x only)** — Indicates that AC power has been disconnected or the power supply has been removed.
- **Red** — Indicates that the associated power supply is operating outside the normal tolerances or has failed. See **Removing and Installing a Power Supply Module** on page 78 to replace the power supply.

Status LED (FOX Matrix 320x only) —

- **Green** — Indicates that the controller board is operating normally and that the temperature and backplane voltages are all within normal tolerances.
- **Red** — Indicates that either the controller board has failed or that temperature or backplane voltages are outside of acceptable levels. See the **Request system status** SIS command on page 31 to identify the source of the indication.

Reset Operations

The rear panel Reset button initiates four levels of resets (numbered 1, 3, 4, and 5 for the sake of comparison with an Extron IPL product). The Reset button is recessed, so use a pointed stylus, ballpoint pen, or small screwdriver to access it.

See the following table for a summary of the modes.

ATTENTION: Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a controller reboot.

NOTE: The reset modes listed below close all open IP and Telnet connections and close all sockets. Also, the following modes are separate functions, not a continuation from mode 1 to mode 5.

Reset Mode Comparison and Summary

Mode	Activation	Result	Purpose and Notes
1	Hold down the recessed Reset button while applying power to the switcher. **NOTE:** After a mode 1 reset is performed, update the switcher firmware to the latest version. Do not operate the switcher firmware version that results from the mode 1 reset. If you want to use the factory default firmware, you must upload that version again. See **Matrix Switchers Control Program** on page 47 or details on uploading firmware.	**The switcher reverts to the factory default firmware.** Event scripting does not start if the switcher is powered on in this mode. All user files and settings, such as IP settings, are maintained. **NOTE:** If you do not want to update firmware, or you performed a mode 1 reset by mistake, cycle power to the switcher to return to the firmware version that was running before the mode 1 reset. Use the **0Q** SIS command on page 31 to confirm that the factory default firmware is no longer running (look for the asterisk [*] following the version number.	Use mode 1 to return the switcher to the factory default firmware version if incompatibility issues arise with user-loaded firmware.
3	Hold the Reset button for approximately 3 seconds, until the Reset LED blinks once, then momentarily press Reset within 1 second.	**Mode 3 turns events on or off.** During resetting, the Reset LED flashes two times if events are starting, three times if events are stopping.	Mode 3 is useful for troubleshooting.
4	Hold the Reset button for approximately 6 seconds, until the Reset LED blinks twice (once at 3 seconds and again at 6 seconds). Then momentarily press Reset within 1 second.	**Mode 4:** • Enables ARP capability. • Sets the IP address to the factory default. • Sets the subnet address to the factory default. • Sets the gateway address to the factory default. • Sets port mapping to the factory default. • Turns DHCP off. • Turns events off. The Reset LED flashes four times in succession during the reset.	Mode 4 enables you to set IP address information using ARP and the MAC address.

5	Hold the Reset button for approximately 9 seconds, until the Reset LED blinks three times (once at 3 seconds, again at 6 seconds, and then again at 9 seconds). Then momentarily press Reset within 1 second.	**Mode 5 performs a complete reset to factory defaults (with the exception of the firmware):**
		• Does everything mode 4 does.
		• Resets most settings, including:
		  • Clears all ties.
		  • Clears all presets.
		  • Clears all output mutes.
		• **(FOX Matrix 320x)** Sets the output lasers to always on.
		• Resets all IP options.
		• Removes all files from the switcher.
		The reset LED flashes four times in succession during the reset.
			Mode 5 is useful if you want to start over with configuration and uploading or to replace events. Same as the Esc **ZQQQ**← SIS command on page 29.

Performing Soft System Resets (Resets 3, 4, and 5)

Perform a soft reset of the switcher as follows (see figure 13):

1. Use a small screwdriver to press and **hold** the rear panel Reset button until the rear panel Reset LED blinks once (events reset), twice (system reset), or three times (absolute reset).

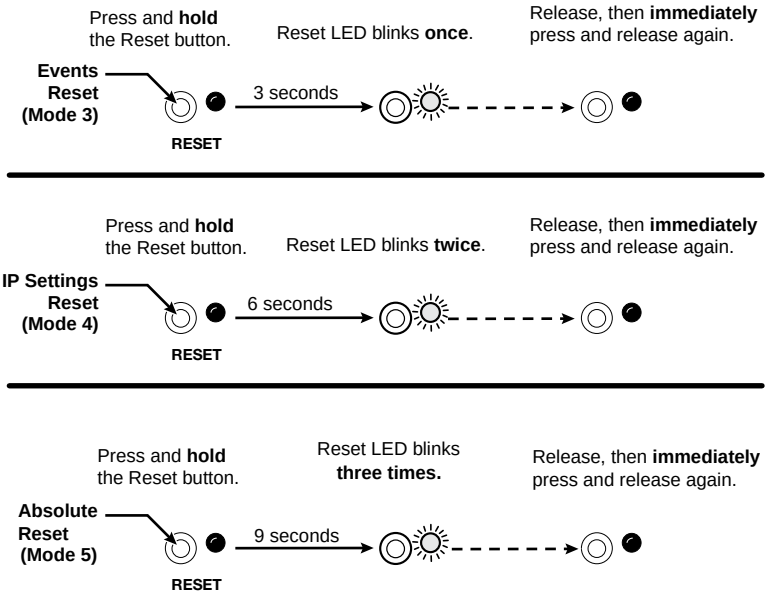

Press and **hold** the Reset button.
Reset LED blinks **once**.
Release, then **immediately** press and release again.
Events Reset (Mode 3)
3 seconds
RESET
Press and **hold** the Reset button.
Reset LED blinks **twice**.
Release, then **immediately** press and release again.
IP Settings Reset (Mode 4)
6 seconds
RESET
Press and **hold** the Reset button.
Reset LED blinks **three times.**
Release, then **immediately** press and release again.
Absolute Reset (Mode 5)
9 seconds
RESET

Figure 13. Resets

2. Release the Reset button and then immediately press and release the Reset button again. Nothing happens if the second momentary press does not occur within 1 second.

Programming Guide

This section describes the operation of the FOX matrix switchers using the Simple Instruction Set, including:

- **Host Control Ports**
- **Host-to-Switcher Instructions**
- **Switcher-Initiated Messages**
- **Switcher Error Responses**
- **Using the Command and Response Tables**
- **Special Characters**

Host Control Ports

The switcher has one or two (depending on the model) serial ports, and an Ethernet LAN port. The FOX Matrix 320x has a USB port. Any of these ports can be connected to a host device such as a computer running the Extron DataViewer utility or the HyperTerminal utility or a control system. These ports make control of the switcher possible.

Serial Ports

The serial ports are:

- **Rear panel Remote port** — A 9-pin D connector for serial RS-232 or RS-422 control (see **Remote Port** and item ③ on page 13).
- **Front panel Configuration port (FOX Matrix 14400 only)** — A 2.5 mm mini stereo jack for serial RS-232 control (see **Front Panel Features** and item ① on page 16).

The default protocol for both ports is as follows:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

The ports can be configured to operate at the 9600, 19200, 38400, or 115200 baud rate.

NOTES:

- These two ports are independent of one another. A front panel Configuration port connection and a rear panel Remote port connection can both be active at the same time.
- The switcher can operate at 9600, 19200, 38400, or 115200 baud rates, but Extron recommends leaving these ports at 9600 baud only.
- The protocol of these ports can be changed via an SIS command only. See the **Set serial ports parameters** SIS command on page 34 to configure these ports using an SIS command.

USB Port (FOX Matrix 320x)

The front panel Configuration port (see **item ②** on page 17 and **Front Panel Features** on page 16), a standard USB cable, and the Extron DataViewer utility, version 2.0 or newer, can be used for remote control of the switcher. The USB cable, available at any local electronics store, should be terminated on one end with a mini USB B male connector.

NOTE: Before you use the FOX Matrix 320x Configuration (USB) port for the first time, you need to install and activate the USB driver on your computer. The simplest way to do this is to install version 8.0 or newer of the Matrix Switchers Control Program and then run the Found New Hardware Wizard. See **Installing the Software** on page 38 and **Activating a USB port for the first time** on page 39.

Ethernet (LAN) Port

The rear panel Ethernet connector on the switcher can be connected to an Ethernet LAN or WAN (see **item ④** and **Ethernet Connection** on page 14). Communications between the switcher and the controlling device is via telnet (a TCP socket using port 23). The TCP port can be changed if necessary. This connection makes SIS control of the switcher possible using a computer connected to the same LAN or WAN. The SIS commands and actions of the switcher are identical to the commands and actions the switcher has when communicating to it via RS-232.

Establishing a connection

Establish a network connection to a FOX matrix switcher as follows:

1. Open a TCP socket to port 23 using the IP address of the switcher.

   NOTE: If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.

   The switcher responds with a copyright message including the date, the name of the product, firmware version, part number, and the current date/time.

   NOTES:

   - If the switcher is not password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.
   - If the switcher is password-protected, a `password` prompt appears below the copyright message.

2. If the switcher is password protected, enter the appropriate administrator or user password.

   If the password is accepted, the switcher responds with `Login User` or `Login Administrator`.

   If the password is not accepted, the `Password` prompt reappears.

Connection timeouts

The Ethernet link times out after a designated period of time of no communications. By default, this timeout value is set to five minutes but the value can be changed. See the **Configure port timeout** SIS commands on page 34.

NOTE: Extron recommends leaving the default timeout at 5 minutes and periodically issuing the Query (Q) command to keep the connection active. If there are long idle periods, Extron recommends disconnecting the socket and reopening the connection when another command must be sent.

Number of connections

A FOX matrix switcher can have up to 200 simultaneous TCP connections, including all http sockets and telnet connections. When the connection limit is reached, the switcher accepts no new connections until some have been closed. No error message or indication is given that the connection limit has been reached. To maximize performance of an IP Link device, keep the number of connections low and close unnecessary open sockets.

Using Verbose Mode

Telnet connections to a FOX matrix switcher can be used to monitor for changes that occur on the switcher, such as front panel operations and SIS commands from other telnet sockets or a serial port. For a telnet session to receive change notices from the switcher, the telnet session must be in verbose mode 1 or 3 (see the **Verbose Mode** SIS command on page 34).

Host-to-Switcher Instructions

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command character sequence. When a command is valid, the unit executes it and sends a response to the host device. All responses from the unit to the host end with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Switcher-initiated Messages

When a local event, such as an equipment power-up, occurs, the unit responds by sending a message to the host. The unit-initiated messages are listed below:

`(c) Copyright 20yy, Extron Electronics, FOX Matrix 320x,`

`Vx.xx, 60-1082-01↵↵`

- or -

`(c) Copyright 20yy, Extron Electronics, FOX Matrix 14400,`

`Vx.xx, 60-1255-01↵↵`

The switcher issues the appropriate copyright message (above) when it first powers on. V*x.xx* is the firmware version number; 60-*xxxx-xx* is the part number of the connected unit.

`↵Password:`

The switcher initiates the password message immediately after the copyright message when the controlling system is connected using TCP/IP or telnet and the switcher is password protected. This message means that the switcher requires an administrator or user level password before it will perform the commands entered via this link. The switcher repeats the password message response for every entry other than a valid password until a valid password is entered.

↵Login Administrator↵

↵Login User↵

The switcher initiates the login message when a correct administrator or user password has been entered. If the user and administrator passwords are the same, the switcher defaults to administrator privileges.

Switcher Error Responses

When the switcher receives a valid SIS command, it executes the command and sends a response to the host device. If the unit is unable to execute the command because the command is invalid or it contains invalid parameters, the unit returns an error response to the host. The error response codes are:

E01 — Invalid input channel number (too large)
E10 — Invalid command
E11 — Invalid preset number
E12 — Invalid output number (too large)
E13 — Invalid value (out of range)
E14 — Illegal command for this configuration
E17 — Timeout (caused only by direct write of global presets)
E21 — Invalid room number
E24 — Privilege violation (Ethernet only. Personnel logged in as users attempting operations requiring supervisors privileges. Users have access to all view and read commands [other than the administrator password], and can create ties and presets, and mute and unmute the output.)

Using the Command and Response Tables

The command and response table begins on **page 25**. Either uppercase or lower case letters are acceptable in the command field. Symbols, defined starting below and used throughout the table, represent variables in the command and response fields. Command and response examples are shown throughout the table. The ASCII to Hex conversion table below is for use with the command and response table.

ASCII to Hex Conversion Table

										Esc	1B	CR	0D	LF	0A
Space →	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F

Command and Response Table for SIS Commands

Symbol Definitions

↵ = CR/LF (carriage return/line feed) (hex ØD ØA)

← = Carriage return (no line feed, hex ØD)

| = Pipe (can be used interchangeably with the ← character)

• = Space character

Esc = Escape key (hex 1B)

W = Can be used interchangeably with the Esc character

X1 = Input number (for tie) — ØØØ – (maximum number of inputs for your configuration) (ØØØ = untied)

X2 = Output number — ØØ1 – (maximum number of outputs for your configuration)

X3 = Mute — Ø = not muted 1 = muted

X4 = SFP number or reclockable output number — ØØØ – 32Ø (FOX Matrix 320x) or 144 (FOX Matrix 14400) (ØØØ = global [SFP only])

X5 = Output reclocking rate — ØØ = auto (default) Ø1 = bypass

X6 = Laser control — Ø = disable 1 = enable 2 = automatic

X7 = Global preset number — ØØ – 64 (ØØ = current configuration for view only)

X8 = Room number (for room presets) — 10 max. (each can have up to 10 presets (X10) assigned)

NOTE: A room is a subset of operator selected outputs that relate to each other. The FOX matrix switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.

X9 = Name — 12 characters maximum for input names, output names, global preset names, and room preset names
Upper- and lower-case alphanumeric characters and _ / and spaces are valid.

NOTE: The following characters are invalid or not recommended in the name: <space> ~ , @ = ‘ [ ] { } < > ’ “ ; : | \ and ?.

X10 = Room preset # — 10 maximum

NOTE: A room preset is a stored configuration with all of the outputs assigned to a single room. When a room preset is retrieved from memory, it becomes the current configuration.

X11 = Connection status — Ø = no input connected 1 = input connected

X12 = Input number — ØØ1 – 32Ø (FOX Matrix 320x) or 144 (FOX Matrix 14400)

X13 = Number (quantity) of inputs — In sets of 16 (Ø16, Ø32, Ø48, Ø64, and so on)

X14 = Number (quantity) of outputs — In sets of 16 (Ø16, Ø32, Ø48, Ø64, and so on)

X15 = Board installed
Ø = No board installed
1 = Non-reclocking multmode board*
2 = Non-reclocking singlemode board*
3 = 3G, SDI, HD-SDI board
4 = Non-pathological multimode board
5 = Non-pathological singlemode board
6 = Pathological singlemode board
x = Unknown board or mix of transceivers

X16 = I/O board slot number — Ø1 – Ø9 or 2Ø

X17 = Transceiver module installed
Ø = No module installed
1 = Non-pathological multimode module
2 = Non-pathological singlemode module
3 = 3G-SDI, HD-SDI, SD-SDI module
4 = Pathological singlemode module

X18 = Transceiver module number — ØØ1 – 32Ø (or maximum number of transceiver modules for your configuration)

X19 = Reclocking status — Ø = Signal reclocked 1 = Signal not reclocked

X20 = Vendor/manufacturer name

X21 = Transmit output power in milliwatts

X22 = Receive optical power in milliwatts

X23 = SFP temperature — Degrees Celsius

X24 = Firmware version number to second decimal place (x.xx)

X25 = Verbose firmware version-description-upload date and time. See the Query firmware version (verbose) command on page 31.

X26 = Voltage — Positive or negative voltage and magnitude

X27 = Temperature — Degrees Fahrenheit

X28 = Fan speed (in RPM)

X29 = Power supply status — 1 = Ok Ø = Out of tolerance or failed

* Legacy board, no longer manufactured, identified for completeness only

Command and Response Table for SIS Commands

Command	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
NOTES: • The matrix switchers support 1-, 2-, and 3-digit numeric entries (1*1, Ø2*Ø2, or ØØ3*ØØ3). • Commands can be entered back-to-back in a string, with no spaces. For example: 1*1!Ø2*Ø2&ØØ3*ØØ3%.			
Create ties			
NOTES: • The quick multiple tie and tie input to all output commands activate all I/O switches simultaneously. • The ! **tie** command, & **tie** command, and % **tie** command can be used interchangeably. • The ! **tie all** command, & **tie all** command, and % **tie all** command can be used interchangeably.			
Tie input X1 to output X2	X1*X2!	OutX2•InX1•All↵	Tie input X1 to output X2.
Example:	1*3!	OutØØ3•InØØ1•All↵	Tie input 1 to output 3.
Tie input X1 to output X2	X1*X2&	OutX2•InX1•RGB↵	Tie input X1 to output X2.
Example (see 2nd Note note above):	1Ø*4&	OutØØ4•InØ1Ø•RGB↵	Tie input 10 to output 4.
Tie input X1 to output X2	X1*X2%	OutX2•InX1•Vid↵	Tie input X1 to output X2.
Example (see 2nd Note note above):	7*5%	OutØØ5•InØØ7•Vid↵	Tie input 7 to output 5.
Quick multiple tie	Esc+QX1*X2!...X1*X2!←	Qik↵	!, &, and % ties are valid.
Example:	Esc+Q3*4!3*5%3*6!4*7!←		Tie input 3 to output 4, output 5, and output 6.
		Qik↵	Tie input 4 to output 7.
Tie input to all outputs	X1*!	InX1•All↵	Tie input X1 to all outputs.
Example (see last Note bullet, above):	5*!	InØØ5•All↵	Tie input 5 to all outputs.
TIP: Ø*! clears all ties.			
Tie input to all outputs	X1*&	InX1•RGB↵	Tie input X1 to all outputs.
Example (see last Note bullet, above):	8*&	InØØ8•RGB↵	Tie input 8 to all outputs.
Tie input to all outputs	X1*%	InX1•Vid↵	Tie input X1 to all outputs.
Example (see last Note bullet, above):	1Ø*%	InØ1Ø•Vid↵	Tie input 10 to all outputs.
Read ties			
NOTES: • The ! **read tie** command, & **read tie** command, and % **read tie** command can be used interchangeably. • When the switcher is in verbose mode, the response is OutX2•InX1•(All)(RGB) or (Vid)↵.			
Read tied input	X2!	X1↵	Input X1 is tied to output X2.
Read tied input, RGB output	X2&	X1↵	Input X1 is tied to output X2.
Read tied input, Vid output	X2%	X1↵	Input X1 is tied to output X2.
Channel mutes			
Channel mute	X2*1B	VmtX2*1↵	Mute output X2 (no signal is output, but the light output remains active).
Channel unmute	X2*ØB	VmtX2*Ø↵	Unmute output X2 (signal is output).
Read channel mute status	X2B	X3↵	1 = mute on, Ø = mute off.
Global channel mute	1*B	Vmt1↵	Mute all output channels.
Global channel unmute	Ø*B	VmtØ↵	Unmute all output channels.

NOTE: X1 = Input number ØØØ – (maximum number of inputs for your configuration) (ØØØ = untied)
X2 = Output number ØØ1 – (maximum number of outputs for your configuration)
X3 = Mute Ø = not muted; 1 = muted

Command and Response Table for SIS Commands (continued)

Command	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
Reclocking			
NOTES: • Laser board reclockers are set on a per SFP basis. If an SFP is reclocked, the corresponding input and output reclockers reclock at the same rate. • HD-SDI reclockers are set on a per output basis only.			
Set output reclocker	X4*X5=	RteX4*X5↵	Set the rate for reclocker X4 to X5.
Example:	8*ØØ=	RteØ8*ØØ↵	Set the rate for reclocker 8 to auto.
Read reclocker status	X4=	X5↵	Show current rate status for reclocker X4.
Laser controls			
Enable individual laser driver	EscX2*1FIBR←	FibrX2*1↵	Enable the laser for output X2. The laser lights so long as power is applied.
Disable individual laser driver	EscX2*ØFIBR←	FibrX2*Ø↵	Disable the laser for output X2. The laser is off.
Set individual output laser driver to automatic	EscX2*2FIBR←	FibrX2*2↵	Set the laser driver for output X2 to automatic. The laser lights when a tie is made to output X2, but is off when no tie is made to output X2 or the output is muted.
Read status of all laser drivers	EscFIBR←	X6[1]X6[2]X6[3]X6[4] ... X6[n]↵	List the laser driver status of all installed outputs. *n* is the highest numbered output for your switcher.
Global laser enable	Esc1*FIBR←	Fibr1↵	Enable all output laser drivers.
NOTE: If your switcher has **any** BNC 3G/HD/SD-SDI boards installed, the global commands are not available. The switcher returns E14.			
Global laser disable	EscØ*FIBR←	FibrØ↵	Disable all output laser drivers.
Global laser automatic	Esc2*FIBR←	Fibr2↵	Set all output laser drivers to automatic.
Save, recall, and directly write presets			
NOTES: • If you try to recall a preset that is not saved, the matrix switcher responds with the error code E11. • The following characters are invalid or not recommended in preset names: + - , ` @ = [ ] { } ‘ “ ; : | \ and ?.			
Save current configuration as a global preset	X7,	SprX7↵	Command character is a comma.
Example:	9,	Spr9↵	Save current ties as preset 9.
Recall a global preset	X7.	RprX7↵	Command character is a period.
Example:	5.	RprØ5↵	Recall preset 5, to become the current configuration.
Direct write process —			
NOTE: The direct write of a global preset should always be preceded by a clear global preset ties command of that same preset number. In a directly-written preset, the tied input of each output position (or no tied input) remains unchanged unless overwritten or cleared. If you do not clear the ties in a global preset number before you directly write a global preset to that number, ties that are part of the previous version of the specified preset with the same number can unexpectedly become part of the newly-created preset.			
Clear ties of a global preset	Esc+X7PØ*!←	SprX7↵	Clear all ties in preset X7.
Directly write a global preset	Esc+X7PX1*X2!X1*X2%X1*X2$ ... X1*X2%←	SprX7↵	Enter as many ties as are valid for this configuration. The **! tie**, **& tie**, and **% tie** commands are all valid
Example:	Esc+27PØ*!←	Spr27↵	Clear all ties in preset 27.
	Esc+27P12*5!10*Ø9%3*2!3*8&←	Spr27↵	Brackets are shown to separate ties for clarity only. Create global preset 27, which ties input 12 to output 5, input 10 to output 9, input 3 to output 2, and input 3 to output 8.

NOTE:
X1 = Input number — ØØØ – (maximum number of inputs for your configuration) (ØØØ = untied)
X2 = Output number — ØØ1 – (maximum number of outputs for your configuration)
X5 = Output reclocking rate — ØØ = Bypass mode; Ø1 = Automatic mode (HDSDI boards only); Ø2 = 1.250 Gbps (laser boards only); Ø3 = 2.125 Gbps (laser boards only); Ø4 = 4.250 Gbps (laser boards only)
X6 = Laser control — Ø = disable; 1 = enable **(default)**; 2 = automatic
X7 = Global preset # — ØØ – 64
X4 = SFP or reclockable output — ØØØ – 144 or 32Ø (FOX Matrix 320x) (ØØØ = global [SFP only])

Command and Response Table for SIS Commands (continued)

Command	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
Save, recall, and directly write presets (continued)			
NOTES: • A room can contain a maximum of 16 outputs (X2s). • If a room is not defined (does not exist in the switcher), the matrix switcher responds with the error code E11. • An output can belong to only one room. • The maximum number of rooms (X8) is 10.			
Write room outputs	Esc X8 , X2¹ , X2² , ... X2ⁿ MR ↵	Mpr X8 , X2¹ , X2² , ... X2ⁿ ↵	See the notes below.
Example:	Esc 8,3,Ø4,5,6MR ↵	Mpr8,Ø3,Ø4,Ø5,Ø6 ↵	Outputs 3, 4, 5, and 6 are assigned to room 8.
Read room outputs	Esc X8 MR ↵	X9 , X2¹ , X2² , ... X2ⁿ ↵	
NOTES: • If no outputs have been assigned to the room, the switcher returns [unassigned]↵. • The default name (X9) is the room number with four trailing spaces: "Room•#X8••••".			
Example:	Esc 3MR ↵	Room•#Ø3••••,Ø1,Ø2,Ø8,Ø9 ↵	Outputs 1, 2, 8, and 9 are assigned to room 3.
Save ties as a room preset	X8 * X10 ,	Rmm X8 •Spr X10 ↵	Command character is a comma.
NOTE: You must have assigned outputs to a room (Esc X8 , MR ↵) before you can save a room preset.			
Example:	3*9,	Rmm Ø3•Spr Ø9 ↵	Save current ties as preset 9 for room 3.
Recall room preset	X8 * X10 .	Rmm X8 •Rpr X10 ↵	Command character is a period.
Clear room preset ties	Esc +X8 *X10 PØ*! ↵	Rmm X8 •Spr X10 ↵	Clear all ties in room X8 preset X10.
Example:	Esc 3MR ↵	Room•#Ø3••••,ØØ1,ØØ2,ØØ8,ØØ9 ↵	Outputs 1, 2, 8, and 9 are assigned to room 3.
Directly write a room preset	Esc +X8 *X10 P X1 *X2 ! X1 *X2 % X1 *X2 $ ... X1 *X2 ! ↵	Rmm X8 •Spr X10 ↵	Enter as many ties as are valid for this configuration. The **!** **tie** command, **&** **tie**, and **%** **tie** commands are all valid and equivalent.
Example:	Esc +7*3P12*7&11*5&4*5%6*6! ↵	Rmm Ø7•Spr Ø3 ↵	Brackets are shown to separate ties for clarity only. Create preset 3 for room 7, which ties input 12 to output 7, input 11 to output 5, input 4 to output 5, and input 6 to output 6.
View ties, mutes, and presets			
NOTE: The **&** **read tie** command and **%** **read tie** command can be used interchangeably.			
View output tie	X2 &	X1 ↵	
Example:	15&	27 ↵	Input 27 is tied to output 15.
View output tie	X2 %	X1 ↵	
Example:	7%	Ø2 ↵	Input 2 is tied to output 7.
View output mutes	Esc VM ↵	X3¹ X3² ... X3ⁿ ↵	Each X3 response is the mute status of an output, starting from output 1. *n* is the highest-numbered installed output.
NOTE: The switcher reports the mute status for all outputs, up to the highest numbered output on the highest numbered slot with an I/O board installed. The switcher does not recognize gaps in the board installation. For example, if boards are installed in only slots 1 and 3, leaving slot 2 empty, the switcher returns mute status for 48 sequential outputs. The mute status for the outputs in slot 2, inputs 17 through 32, can be ones or zeroes (the switcher allows you to mute an output that is not installed, so long as it is numbered lower than the highest numbered output installed).			

NOTE:
X1 = Input number — ØØØ – (maximum number of inputs for your configuration) (ØØØ = untied)
X2 = Output number — ØØ1 – (maximum number of outputs for your configuration)
X3 = Mute — Ø = not muted; 1 = muted
X8 = Room # (for room presets) — Ø1 – 1Ø (each can have up to 10 presets (X10s) assigned)
X10 = Room preset # — Ø1 – 1Ø

Command and Response Table for SIS Commands (continued)

Command	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
View ties, mutes, and presets (continued)			
View global preset configuration	Esc X7 * X2 * 1VC ←	X1^{n}•X1^{n+1}• ... •X1^{n+15}•Vid↵	Show the configuration of preset X7. Show the input tied to 16 sequential outputs, starting from output X2. *n* is the starting output number.
Command description:	preset # (X7) * starting output # (X2) * 1VC		
Response description:	input # (X1) tied to X2^{n}•X1 tied to X2^{n+1}•X1 tied to X2^{n+2}• ... •X1 tied to X2^{n+15}•Vid↵		
Example **(32 x 32 matrix)**:	Esc 23 * 25 * 1VC ←		

input 8 tied to output 28; input 2 tied to output 27; no tied input; outputs do not exist

Response = tied input: ØØ8•ØØ8•ØØ2•Ø08•Ø08•ØØ1•ØØØ•ØØØ•--•--•--•--•--•--•--•--•Vid↵

Output: 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Each position shown in the response is an output: left = output 25 (the starting output number), right = output 32. (Outputs 33 through 40 are not present on this FOX matrix switcher.) The number in each position is the input tied to that output.

In this example, video input 8 is tied to outputs 25, 26, 28, and 29; input 2 is tied to output 27; and input 1 is tied to output 30. No inputs are tied to outputs 31 and 32.

NOTE: Esc X7 * 1 * 1VC ← where X7 = Ø returns the current video configuration of the switcher.

View room preset configuration	Esc X8 * X10 * X2 * 1VC ←	X1^{n}•X1^{n+1}• ... •X1^{n+15}•Vid↵	Show the configuration of room X8, preset X10. Show the input tied to up to 16 outputs assigned to room X8. *n* is the starting output number.
Command description:	room # (X8) * room preset # (X10) * starting output # (X2) * 1VC		
Response description:	input # (X1) tied to X2^{n}•X1 tied to X2^{n+1}•X1 tied to X2^{n+2}• ... •X1 tied to X2^{n+15}•Vid↵		
List input link detection			

NOTE: The switcher reports the link status for only as many inputs as are supported by the highest numbered slot with an I/O board installed. The switcher does not recognize gaps in the board installation. For example, if only two boards are installed, in slots 1 and 3, leaving slot 2 empty, the switcher returns link status for 48 sequential inputs. The input link response for the inputs supported by the board in slot 2, inputs 17 through 32, are all zeroes.

View all input connections	ØLS	X11^{1}X11^{2}X11^{3}...X11^{n}↵	Each X11 response is the connection status of all inputs, starting from input 1. *n* is the highest-numbered installed input.
Example:	ØLS		

no input detected; input detected

Response Status: Ø Ø Ø 1 1 1 Ø . . . Ø↵

Input: 1 2 3 4 5 6 7 *n*

NOTE:
- X1 = Input number (for tie)
- X2 = Output number
- X11 = Connection status
- X7 = Global preset #
- X8 = Room # (for room presets)
- X10 = Room preset #

- ØØ – (maximum number of inputs for your configuration) (ØØ = untied)
- Ø1 – (maximum number of outputs for your configuration)
- Ø = no input connected 1 = input connected
- ØØ – 64 (ØØ = current configuration for views only)
- Ø1 – 1Ø (each can have up to 10 presets (X10s) assigned)
- Ø1 – 1Ø maximum

Command and Response Table for SIS Commands (continued)

Command	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
Names			
NOTES: • The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35). • Do not use leading spaces in preset names. • If a preset is unassigned, the X10 displays [unassigned]. • If a global preset is saved, but not yet named, the default name is Preset•X7. • If a room preset is saved, but not yet named, the default name is RmX8•PrstX9.			
Write global preset name	EscX7,X9NG←	NmgX7,X9↵	
Example:	Esc1,Security 1NG←	NmgØØ1,Security 1↵	Name global preset 1 “Security 1.”
Read global preset name	EscX7NG←	X9↵	
Example:	Esc2NG←	Security 2↵	Global preset 2 is named “Security 2.”
Write room preset name	EscX8*X10,X9NP←	NmpX8*X10,X9↵	
Example:	Esc1*3,Podium_DVDNP←	NmpØ1*3,Podium_DVD↵	Name room1, preset 3 “Podium_DVD.”
Read room preset name	EscX8*X10NP←	X9↵	
Write input name	EscX12,X9NI←	NmiX12,X9↵	
Example:	Esc1,Podium camNI←	NmiØ1,Podium cam↵	Name input 1 “Podium cam.”
Read input name	EscX12NI←	X9↵	
Write output name	EscX2,X9NO←	NmoX2,X9↵	
Example:	Esc1,Main PJ1NO←	NmoØ1,Main PJ1↵	Name output 1 “Main PJ1.”
Read output name	EscX2NO←	X9↵	
Resets			
Reset global presets and names	EscZG←	Zpg↵	Clear all global presets and their names.
Reset **one** global preset	EscX7ZG←	ZpgX7↵	Clear global preset X7.
Reset all mutes	EscZZ←	Zpz↵	Unmute all outputs.
Reset room map	EscZR←	Zpr↵	Clear all room definitions.
Reset individual room	EscX8ZR←	ZprX8↵	Delete room X8.
Reset all room presets	EscZP←	Zpp↵	Clear all room presets and names.
Reset individual room preset	EscX8*X10ZP←	ZppX8*X10↵	Clear an individual room preset and name.
Reset whole switcher	EscZXXX←	Zpx↵	Clear all ties and presets.
Absolute reset	EscZQQQ←	Zpq↵	Similar to **Reset whole switcher**, plus clear the IP address to 192.168.254.254 and subnet mask to 255.255.000.000.
Reset all device settings	EscZY←	Zpy↵	

NOTE:	X2 = Output number	Ø1 – (maximum number of outputs for your configuration)
	X7 = Global preset #	ØØ1 – Ø64
	X8 = Room # (for room presets)	Ø1 – 1Ø (each can have up to 10 presets (X10s) assigned)
	X9 = Name	11 characters maximum for room names 12 characters maximum for all other names
	X10 = Room preset #	ØØ – 1Ø (Ø = current configuration for room)
	X12 = Input number (for other than tie)	Ø1 – (maximum number of inputs for your configuration)

Command and Response Table for SIS Commands (continued)

Command	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
File management			
NOTE: The response to the View File Directory command differs, depending on whether the command is sent via an RS-232/RS-422 or Telnet connection or sent via a web browser connection.			
View file directory RS-232/RS-422 port and Telnet	Esc DF ←	*filename*1,*date*/*time*,*length*↵ *filename*2,*date*/*time*,*length*↵ • •↵ • •↵ *filenamen*,*date*/*time*,*length*↵ # *of Bytes*•*Left*↵↵	List user-supplied files.
View file directory Web browser	Esc DF ←	Var file = new array (); File [1] = '*filename*1,*date*1,*filesize*1'; File [2] = '*filename*2,*date*2,*filesize*2'; • • • • File [*n*] = '*filenamen*,*daten*,*filesizen*'; File [*n*+1] = # of Bytes•Left	List user-supplied files.
Erase user-supplied web pages/files	Esc <filename> EF ←	Del<filename>↵	
Information requests			
Information request	I	V X13 X X14 •A X13 X X14 •S X15[1] X15[2] … X15[n]↵	V X13 X X14 shows the number of available inputs and outputs for this configuration. A X13 X X14 has no meaning for this product. S X15[1] X15[2] … X15[n] shows the board type installed in each slot. *n* is either 9 or 20, depending on the model.
Slot/plane/LC information	Ø* X16 I	X17[a] X17[b] X17[c] … X17[p]↵	
Request part number	N	68-*nnnn*-*nn*↵	See **www.extron.com**, for part numbers.
Request part number and board configuration	*N	68-*nnnn*-*nn*.X15[1] X15[2] X15[3] … X15[n]↵	Part number plus I/O boards installed. *n* is either 9 or 20, depending on the model.
Read reclocker status	X4 =	X5↵	Show current reclocker status for output X4.
NOTE: The switcher automatically detects and reclocks the signal if the rate is 4.25 Gbps **only**. Other rates are ignored.			
View SFP module status	4Ø* X18 S	X20 •X21 •X22 •X23 ↵	

NOTE:

X13 = Number (quantity) of inputs	In sets of 16 (**Ø16**, **Ø32**, **Ø48**, **Ø64**, and so on)	
X14 = Number (quantity) of outputs	In sets of 16 (**Ø16**, **Ø32**, **Ø48**, **Ø64**, and so on)	
X15 = Board installed	**Ø** = No board installed	**4** = Non-pathological multimode board
	1 = Non-reclocking multimode board	**5** = Non-pathological singlemode board
	2 = Non-reclocking singlemode board	**6** = Pathological singlemode board
	3 = 3G, SDI, HD-SDI board	**X** = Unknown board or mix of transceivers
X16 = I/O board slot number	**Ø1** – **2Ø** (FOX Matrix 320x) or **Ø1** – **Ø9** (FOX Matrix 14400)	
X17 = Transceiver module installed	**Ø** = No module installed	
	1 = Non-pathological multimode module	**3** = 3G-SDI, HD-SDI, SD-SDI module
	2 = Non-pathological singlemode module	**4** = Pathological singlemode module
X18 = Transceiver module number	**ØØ1** – **32Ø** (or maximum number of transceiver modules for your configuration)	
X19 = Reclocking status	**Ø** = signal reclocked	**1** = signal not reclocked
X20 = Vendor/manufacturer name		
X21 = Transmit output power in milliwatts		
X22 = Receive optical power in milliwatts		
X23 = SFP temperature	Degrees Celsius	
X5 = Output reclocking rate	**ØØ** = Bypass mode	
	Ø1 = Automatic mode (HDSDI boards only)	**Ø3** = 2.125 Gbps (laser boards only)
	Ø2 = 1.250 Gbps (laser boards only)	**Ø4** = 4.250 Gbps (laser boards only)
X4 = SFP or reclockable output number	**ØØØ** – **32Ø** or **144** (FOX Matrix 14400) (**ØØØ** = global [SFP only])	

Command and Response Table for SIS Commands (continued)

Command	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
Information requests (continued)			
NOTE: There are up to three separate sets of Extron firmware on which the switcher can report: the controller firmware, which is the overall control firmware; the Ethernet protocol firmware, which handles the Ethernet interface; and the latest optional Extron firmware update, which is available at **www.extron.com**.			
Query firmware version	Q	X24↵	
Example:	Q	1.23↵	The factory-installed controller firmware version is 1.23 (sample value only).
Query controller firmware version (verbose)	ØQ	X24-X25-X25↵	Provide a detailed status of the Ethernet protocol firmware, the controller firmware, and any firmware upgrade. An asterisk (*) marks the firmware that is running. A caret (^) marks that the firmware has a bad checksum or an invalid load. ?.?? marks that firmware is not loaded.
Response description:		*Ethernet protocol firmware version-controller firmware version-updated firmware version*↵	
Example:	Øq		

Description | * indicates the version running | Upload date and time

1.23-1.ØØ(1.68-FOMX Series -Wed, 2Ø Feb 2ØØ8 ØØ:ØØ:ØØ GMT)-1.ØØ*(1.Ø6-FOMX Series -Mon, 17 Mar 2ØØ7 16:39:21 GMT)↵

Ethernet protocol firmware | FOX Matrix firmware version | Updated firmware version

Request system status	S	
FOX Matrix 320x		X26•X26•X26•X26•X26•X26•X26•X26•X26•X27•X28•X28•X28•X28•X28•X28•X28•X28•X29•X29•X29•X29↵
FOX Matrix 14400		X26•X26•X26•X26•X26•X26•X26•X27•X28•X28•X28•X28↵

Response description (**FOX Matrix 320x**):

+3.3V•+5V•+2.5V•+1.8V•+12V (backplane) •+12V (primary PS1)•+12V (redundant PS1)•+12V (Primary PS2)•+12V (redundant PS2)•Temp•Fan1 RPM•Fan2•Fan3•Fan4•Fan5•Fan6•Fan7•Fan8•Pri1 PS status•Red1 PS status•Pri2 PS status•Red2 PS status↵

Response description (**FOX Matrix 14400**):

+3.3V•+5V•+1.3V•+1.2V•+12V (backplane)•+12V (redundant PS)•+12V (primary PS)•Temp•Fan1 RPM•Fan2•Fan3•Fan4↵

Example (**FOX Matrix 14400**): S

Backplane receiving 12.00 V | Internal temperature 78.8° F

3.27•4.95•1.31•1.22•12.00•12.06•12.12•+078.80•02909•02909•02909•02860↵

3.3 V power system at 3.27 V | Fan 1 rotating at 2,909 RPM

NOTE:
- X24 = Firmware version number to second decimal place (*x.xx*)
- X25 = Verbose firmware version-description-upload date/time. See above
- X26 = Voltage — Positive or negative voltage and magnitude
- X27 = Temperature — Degrees Fahrenheit
- X28 = Fan speed (in RPM)
- X29 = Power supply status — 1 = Ok — Ø = Out of tolerance or failed

Command and Response Table for IP- and SNMP-Specific SIS Commands

Symbol definitions

X40 = Matrix name — (Up to 24 alphanumeric characters)

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

X41 = Default name — FOX-Matrix- + last 3 pairs of MAC address

X42 = Time and date (for set) — In the format: MM/DD/YY•HH:MM:SS *where*:
MM = month: Ø1 (Jan) through 12 (Dec)
DD = day: Ø1 through 31
YY = year: ØØ through 99
HH = hour: ØØ through 23
MM = minutes: ØØ through 59
SS = seconds: ØØ through 59

X43 = Time and date (for read) — In the format: Day,•DD•Mmm•YYYY•HH:MM:SS *where*:
Day = weekday: Mon through Sun
DD = date: Ø1 through 31
Mmm = month: Jan through Dec
YYYY = year: 2ØØØ through 2Ø99
HH = hour: ØØ through 24
MM = minutes: ØØ through 59
SS = seconds: ØØ through 59

X44 = GMT offset — –12.Ø through +14.Ø. Hours and minutes removed from GMT

X45 = Daylight Saving Time — Ø = Daylight Saving Time off or ignore; 1 = Daylight Saving Time on (North America); 2 = Daylight Saving Time on (Europe); 3 = Daylight Saving Time on (Brazil)

X46 = IP address — *nnn.nnn.nnn.nnn*

X47 = Hardware (MAC) address — *nn-nn-nn-nn-nn-nn*

X48 = Number of open connections — Ø – 255

X49 = Password — 12 alphanumeric characters

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

X50 = Domain name — Standard domain name rules apply (for example: *xxx*.com)

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35). The @ character is acceptable only as the lead-in to the domain name (such as @extron.com).

X51 = E-mail account 1 through 5 — 65 – 69. 65 = e-mail recipient 1, 66 = 2, 67 = 3, ... 69 = recipient 5

X52 = E-mail address — Typical e-mail address format (for example: *nnnn@xxx*.com)

X53 = Notification selections, part 1 — I = inputs; F = fans; P = power supply

X54 = Notification selections, part 2 — If **X53** = **I, then** **X54** = ØØØ (all inputs), or inputs Ø01 through 144 (32Ø)
If **X53** = **F, then** **X54** = ØØ (all fans)
If **X53** = **P, then** **X54** = ØØ (all power supplies)

X55 = Notify when? — Ø = no response; 1 = fail/missing; 2 = fixed/restored; 3 = both 1 & 2; 4 = suspend

X56 = DHCP and SNMP — Ø = off or disable, 1 = on or enable

X57 = Port # — ØØ (all ports), Ø1 (rear panel), Ø2 (front panel)

X58 = Baud rate — 96ØØ, 192ØØ, 384ØØ, 1152ØØ

X59 = Parity — **o**dd, **e**ven, **n**one, **m**ark, **s**pace (only the first letter required)

X60 = Data bits — 7, 8

X61 = Stop bits — 1, 2

X62 = Port type — Ø = RS-232, 1 = RS-422

X63 = Verbose mode — Ø = clear or none (default for Telnet connection)
1 = verbose mode (default for RS-232 or RS-422 connection)
2 = tagged responses for queries, verbose mode not enabled
3 = verbose mode and tagged for queries

NOTE: If tagged responses are enabled, all read commands return the constant string and the value as the set command does (for example, the read matrix name command Esc CN ← returns Ipn•X40 ↵).

X64	= Port timeout (10-sec. increments)	1 (= 10 seconds) – 65ØØØ (default is 3Ø = 300 seconds = 5 minutes)
X65	= SMNP port number	ØØØØØ (= disable) – *nnnnn*. Default = ØØ161. Leading zeroes are not necessary for entry.
X66	= SNMP contact name and location	Up to 64 alphanumeric characters. Default = Not•Specified.
X67	= SNMP community name	Up to 64 alphanumeric characters. Default = public (for read community) or private (for read-write community).
X68	= Trap target	1 – 3
X69	= SNMP trap version	2 or 3, or Ø = empty (**default**) if no target set
X70	= SNMP target 1 through 3	7Ø – 72. 7Ø = SNMP target 1, ... 72 = target 3

Command and Response Table for IP- and SNMP-Specific SIS Commands

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
IP setup commands			
Set matrix name	Esc X40 CN ←	Ipn• X40 ↵	
Read matrix name	Esc CN ←	X40 ↵	
Reset matrix name to factory default	Esc • CN ←	Ipn• X40 ↵	"FOX-Matrix-" plus the last 3 pairs of the MAC address.
Set time and date	Esc X42 CT ←	Ipt X42 ↵	
Read time and date	Esc CT ←	X43 ↵	
Set GMT offset	Esc X44 CZ ←	Ipz X44 ↵	In the command, the divider between hours and minutes can be either a colon (:) or a period. In the response, the divider is a colon.
Example:	Esc 8.ØCZ ←	Ipz+Ø8:ØØ ↵	
Set Daylight Saving Time	Esc X45 CX ←	X45 ↵	
Read Daylight Saving Time	Esc CX ←	X45 ↵	
Set IP address	Esc X46 CI ←	Ipi X46 ↵	
Read IP address	Esc CI ←	X46 ↵	
Read hardware address	Esc CH ←	X47 ↵	
Read # of open connections	Esc CC ←	X48 ↵	
Set subnet mask	Esc X46 CS ←	Ips X46 ↵	
Read subnet mask	Esc CS ←	X46 ↵	
Set gateway IP address	Esc X46 CG ←	Ipg X46 ↵	
Read gateway IP address	Esc CG ←	X46 ↵	
Set administrator password	Esc X49 CA ←	Ipa• X49 ↵	
Read administrator password	Esc CA ←	X49 ↵	
Reset (clear) administrator password	Esc • CA ←	Ipa• ↵	
Set user password	Esc X49 CU ←	Ipu• X49 ↵	
Read user password	Esc CU ←	X49 ↵	
Reset (clear) user password	Esc • CU ←	Ipu• ↵	
Set mail server, domain name	Esc X46 , X50 , X49 CM ←	Ipm X46 , X50 , X49 ↵	
Read mail server, domain name	Esc CM ←	X46 , X50 , X49 ↵	
Set e-mail recipient	Esc X51 , X52 CR ←	Ipr X51 , X52 , ↵	This command sets the e-mail recipient. To receive e-mail notifications, you must then set the events that the switcher reports, using one or more separate **Set e-mail** (EM) commands (on the next page).
Example:	Esc 69,Jsmith@folklore.netCR ←	Ipr69,Jsmith@folklore.net, ↵	
Read e-mail recipient or target	Esc X51 CR ←	X52 , ↵	

Command and Response Table for IP- and SNMP-Specific SIS Commands (continued)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
IP setup commands (continued)			
Set e-mail events for recipient	Esc X53 X51 , X54 , X55 , ØEM ←	Ipe X53 X51 * X54 * X55 * Ø ↵	You must first have set an e-mail recipient for the X51 variable, using the separate **Set e-mail recipient** (CR) command on the previous page.
Example:	Esc I69,63,3,ØEM ←	IpeI69*63*3*Ø ↵	E-mail account #69 (recipient #5, JSmith), will receive fail/missing and fixed/restored messages for input 63.
Read e-mail notifications for one account (recipient)	Esc X53 X51 , X54 EM ←	X55 X55 X55 ... X55 *Ø ↵	
Set DHCP on or off	Esc X56 DH ←	Idh X56 ↵	X56: Ø = off, 1 = on
Read DHCP on/off status	Esc DH ←	X56 ↵	
Set serial port parameters	Esc X57 * X58 , X59 , X60 , X61 CP ←	Cpn X57 •Ccp X58 , X59 , X60 , X61 ↵	
Read serial port parameters	Esc X57 CP ←	X58 , X59 , X60 , X61 ↵	
Set serial port mode	Esc X57 * X62 CY ←	Cpn X57 •Cty X62 ↵	X62: Ø = RS-232, 1 = RS-422,
Read serial port mode	Esc X57 CY ←	X62 ↵	
Set verbose mode	Esc X63 CV ←	Vrb X63 ↵	
Read verbose mode	Esc CV ←	X63 ↵	
Configure current port timeout	Esc Ø * X64 TC ←	PtiØ* X64 ↵	
View current port timeout	Esc ØTC ←	X64 ↵	
Configure global IP port timeout	Esc 1 * X64 TC ←	Pti1* X64 ↵	
View global IP port timeout	Esc 1TC ←	X64 ↵	
SNMP setup commands			
NOTE: See **SNMP Settings Page**, on page 68. This HTML page provides introductory information about Simple Network Management Protocol (SNMP) and is the preferred method for performing the functions listed below.			
Port mapping			
Map SNMP port	Esc A X65 PMAP ←	PmapA X65 ↵	Assign a specific port. **Default**:161.
Reset SNMP port to default	Esc A161PMAP ←	PmapAØØ161 ↵	
Disable SNMP port	Esc AØPMAP ←	PmapAØØØØØ ↵	Assign no port for SNMP. Assign a valid port to enable.
View current SNMP port	Esc APMAP ←	X65 ↵	
Unit contact name and location			
NOTE: No contact or location (as opposed to Not•Specified, the default value) is not a valid entry.			
Set unit contact info	Esc C X66 SNMP ←	SnmpC* X66 ↵	Set contact info to X66.
Reset unit contact info to default	Esc C•SNMP ←	SnmpC*Not•Specified ↵	
View unit contact info	Esc CSNMP ←	X66 ↵	
Set unit location info	Esc L X66 SNMP ←	SnmpL* X66 ↵	Set location info to X66.
Reset unit location info to default	Esc L•SNMP ←	SnmpL*Not•Specified ↵	
View unit location info	Esc LSNMP ←	X66 ↵	
Community names			
Set unit read-only community name	Esc P X67 SNMP ←	SnmpP* X67 ↵	Set read-only (public) name to X67.
Reset read-only community name to default	Esc P•SNMP ←	SnmpP*public ↵	
View unit read-only name	Esc PSNMP ←	X67 ↵	
Set unit read-write community name	Esc X X67 SNMP ←	SnmpX* X67 ↵	Set read-write (private) name to X67.
Reset read-write community name to default	Esc X•SNMP ←	SnmpX*private ↵	
View unit read-write name	Esc XSNMP ←	X67 ↵	
Access enable			
Enable SNMP access and traps	Esc E1SNMP ←	SnmpE*1 ↵	
Disable SNMP access and traps	Esc EØSNMP ←	SnmpE*Ø ↵	Default is disabled.
View SNMP access setting	Esc ESNMP ←	X56 ↵	

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
SNMP setup commands (continued)			
Trap targets			
Set trap target	Esc T X67 , X68 * X46 * X69 SNMP ←	SnmpT* X67 , X68 * X46 * X69 ↵	
Clear trap target	Esc T X68 *ØSNMP ←	SnmpT* , X68 *Ø.Ø.Ø.Ø*Ø ↵	
View trap target	Esc T X68 SNMP ←	X67 , X68 * X46 * X69 ↵	
Trap target notifications			
Set SNMP events for target	Esc X53 X70 , X54 , X55 , 1EM ←	Ipe X53 X70 * X54 * X55 *1 ↵	Notify target X70 of events defined by X53, X54, and X55.
Example:	Esc F72,Ø,1,1EM ←	IpeF72*Ø*1*1 ↵	Notify account #72 (SNMP target #3) upon any fan failure.
Read SNMP events for target	Esc X53 X70 , X54 EM ←	X55 X55 X55 ... X55 *1 ↵	

Special Characters

The HTML language reserves certain characters for specific functions. The switcher does not accept these characters as part of preset names, name of the switcher, passwords, or locally created file names.

The following characters are not valid or not recommended:
{space (spaces **are** ok for names)} + ~ , @ = ‘ [ ] { } < > ’ “ semicolon (;) colon (:) | \ and ?.

Matrix Software

This section introduces the Extron Matrix Switchers Control Program, which is available on the Extron website, including:

- **About this Program**
- **Installing the Software**
- **Using the Matrix Switchers Control Program**

About this Program

The Extron Matrix Switchers Control Program communicates with the switcher via the Ethernet LAN port, a serial port, or the mini USB port (FOX Matrix 320x only) to provide an easy way to set up ties and sets of ties. The program is compatible with Windows 2000, Windows XP, Windows 7, and newer operating systems. Updates to these programs can be downloaded from the Extron website.

Software Operation via Ethernet

When a matrix switcher is connected to an Ethernet WAN or LAN, up to 200 users can operate it, locally or remotely, using the Matrix Switchers Control Program. See **Ethernet Connection** on page 14 for installation details.

Connection to the switcher via the Ethernet is password protected. There are two levels of password protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can select inputs and outputs, recall presets, and view all settings with the exception of passwords. If the same password or no password is required for logging on, all personnel log on with administrator privileges. Fields and functions that exceed user privileges are not selectable in the Matrix Switchers Control Program when the operator is logged on as a user.

Ethernet protocol settings

The IP Settings/Options window (see **figure 20** on page 43) provides a location for viewing and, if the PC is connected via the RS-232 link or if you are logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See **IP Settings/ Options Window** on page 43 for more details.

Software Operation via a Serial Port

On the FOX Matrix 14400, the two serial ports are independent of one another. A front panel Configuration port connection and a rear panel Remote RS-232/RS-422 port connection can be active at the same time.

The default serial port protocol of both ports is as follows:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

The serial ports can be configured to operate at the 9600, 19200, 38400, or 115200 baud rate but Extron recommends leaving these ports at 9600 baud only.

See the **Serial port parameters** SIS commands on page 34 to configure either port using an SIS command.

Software Operation via USB Port (FOX Matrix 320x)

The front panel Configuration port (see **item** ② on page 17 and **Front Panel Features**), a standard USB cable, and the Extron DataViewer utility, version 2.0 or newer, can be used for remote control of the switcher using the Matrix Switchers Control Program. The USB cable, available at any local electronics store, should be terminated on one end with a mini USB B male connector

NOTE: Before you use the FOX Matrix 320x Configuration (USB) port for the first time, you need to install and activate the USB driver on your computer. The simplest way to do this is to install version 8.0 or newer of the Matrix Switchers Control Program and then run the Found New Hardware Wizard. See **Installing the Software** on the next page and **Activating a USB port for the first time** on page 39.

Installing the Software

The Matrix Switchers Control Program and Firmware Loader are available on the Extron website. Download and install both programs as follows:

NOTE: Steps 1 through 6, below, are also used to download firmware update packages.

1. Visit **www.extron.com** and click the **Download** tab (see figure 14).

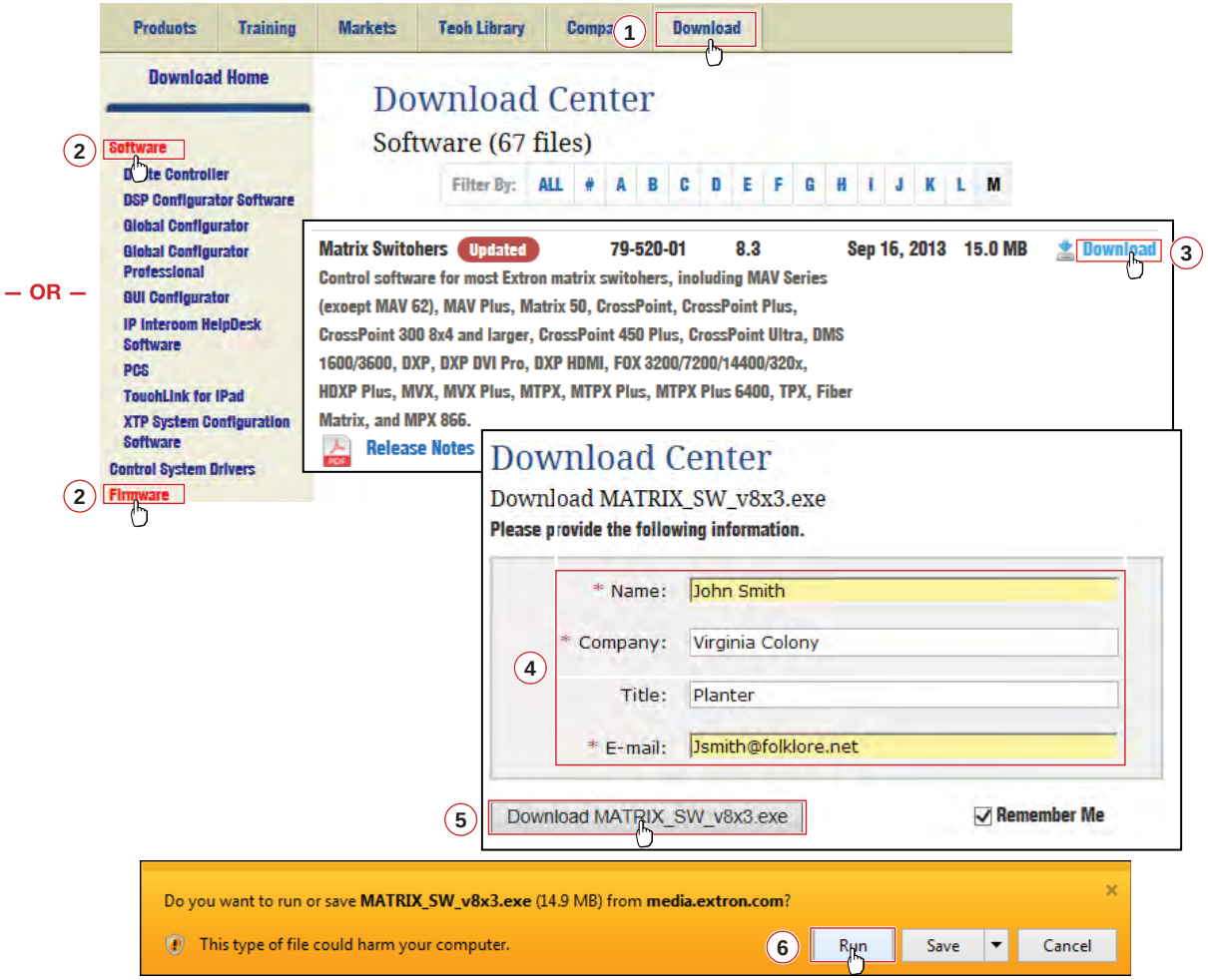

Produots
Training
Markets
Teoh Library
Compa
1
Download
Download Home
Download Center
Software (67 files)
2
Software
DSP Configurator Software
Global Configurator
Global Configurator Professional
GUI Configurator
IP Interoom HelpDesk Software
PCS
TouchLink for IPad
XTP System Configuration Software
Control System Drivers
2
Firmware
— OR —
Filter By: ALL # A B C D E F G H I J K L M
Matrix Switchers Updated 79-520-01 8.3 Sep 16, 2013 15.0 MB Download
3
Control software for most Extron matrix switchers, inoluding MAV Series (exoept MAV 62), MAV Plus, Matrix 50, CrossPoint, CrossPoint Plus, CrossPoint 300 8x4 and larger, CrossPoint 450 Plus, CrossPoint Ultra, DMS 1600/3600, DXP, DXP DVI Pro, DXP HDMI, FOX 3200/7200/14400/320x, HDXP Plus, MVX, MVX Plus, MTPX, MTPX Plus, MTPX Plus 6400, TPX, Fiber Matrix, and MPX 866.
Release Notes
Download Center
Download MATRIX_SW_v8x3.exe
Please provide the following information.
* Name: John Smith
* Company: Virginia Colony
Title: Planter
* E-mail: Jsmith@folklore.net
4
5
Download MATRIX_SW_v8x3.exe
Remember Me
Do you want to run or save MATRIX_SW_v8x3.exe (14.9 MB) from media.extron.com?
This type of file could harm your computer.
6
Run
Save
Cancel

Figure 14. Downloading a Software or Firmware Package

2. Click the **Software** or **Firmware** link as appropriate to the operation you are performing.
3. Select the desired software or firmware file to download and click **Download**.

   TIP: Click the appropriate `Filter By:` letter to jump to the correct page of downloads.

4. Enter the requested personal information.

   TIP: Click **Remember Me** to eliminate step 4 in future downloads.

5. Click **Download** to copy the software or firmware to your computer.
6. Click **Run** to confirm that you want to run the installation.
7. **For a firmware download**, exit this procedure and return to **Updating Firmware** on page 47 or **Firmware Upgrade Page** on page 70.

8. Follow the on-screen instructions. The installation creates a `C:\Program Files\Extron\Matrix_Switchers` directory, and it places the following four icons into a group folder named "`Extron Electronics\Matrix Switchers`":

   NOTE: The folder is `C:\Program Files(x86)\` ... for Windows 7 or Windows 8.

   - MATRIX Switcher + Control Program
   - MATRIX Switcher + Help
   - Check for Matrix Updates
   - Uninstall MATRIX Switcher

Using the Matrix Switchers Control Program

Many items found in the Matrix Switchers Control Program are also accessible under SIS control (see **Programming Guide**, beginning on page 20).

NOTE: The first time you connect to the Configuration (USB) port, the Found New Hardware Wizard appears (see figure 15) (see "Activating a USB Port for the First Time," below).

For other connections, proceed to **Starting the program** on the next page.

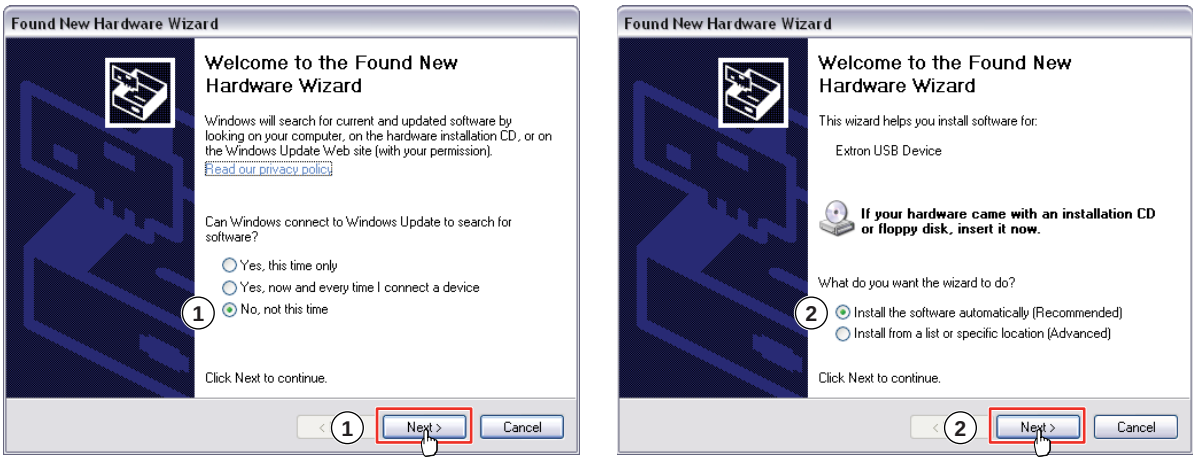

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
1
Click Next to continue.
1
Next >
Cancel
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Extron USB Device
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
2
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
2
Next >
Cancel

Figure 15. Found New Hardware Wizard

Activating a USB Port for the First Time

The first time you connect to the FOX Matrix 320x Configuration (USB) port, the Found New Hardware Wizard appears (see figure 15). Activate the connected USB port for your device as follows:

NOTE: If you have not installed the latest Matrix Switchers Control Program (version 8.0 or newer), click **Cancel** and install the program. Reconnect the switcher to the Configuration port.

1. Select the **`No, not this time`** radio button and click **`Next`**.
2. Select the **`Install the software automatically`** radio button and click **`Next`**. Follow the on-screen instructions. The wizard assigns the driver necessary to access the switcher to the connected Configuration (USB) port (this may take a few minutes).
3. Click **`Finish`** to exit the wizard.

4. Proceed to “Starting the Program,” below, or return to the Command and Response Table in **Programming Guide**, beginning on page 25.

> **NOTE:** You may need to repeat these steps if you subsequently connect the switcher to a different USB port on the same computer.

Starting the Program

1. To run the Matrix Switchers Control Program, click **`Start`** > **`Programs`** > **`Extron Electronics`** > **`Matrix Switchers`** > **`MATRIX Switcher + Control Pgm`**.

MATRIX Switcher+ Control Pgm

The Comm Port Selection window appears (see figure 16).

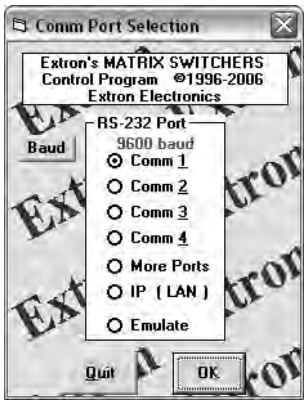
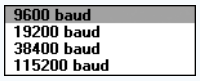


Figure 16. Comm Port Selection Window

2. Choose either the comm port that is connected to one of the serial ports of the switcher, **`IP [LAN]`**, or **`Emulate`**.

   - **If you selected a comm port**, check the baud rate displayed in the comm port selection dialog box.

     > **NOTE:** If you need to change the baud rate, click the **`Baud`** button and double-click the desired baud rate. The default is **`9600`**.
     >
     > 
     >

     Click **`OK`**. The Extron Matrix Switchers Control Program window appears, displaying the current configuration of the attached matrix (see **figure 18** and **figure 19** on page 42). Proceed to step 4.

- **If you selected `IP [LAN]`**, click **`OK`** and proceed to step 3.
- **If you selected `Emulate`**, click **`OK`** and see **Using Emulation Mode** on page 56.

3. **If you selected `IP [LAN]` in step 2**, the **`IP Connection`** dialog box appears (see figure 17).

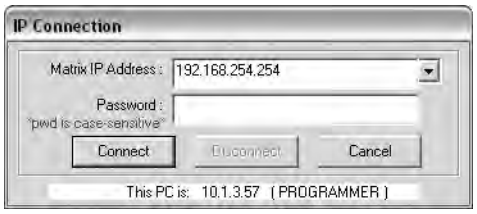


Figure 17. Address and Password Entry

a. Examine the Matrix IP Address field in the IP Connection window. The field displays the last Extron IP address entered.

- **If the IP address is correct**, proceed to step 3b.
- **If the address is not correct**, either click in the **`Extron IP Address`** field and enter the IP address or click the scroll down button (▾) and select from among the recently used addresses. Proceed to step 3b.

> **NOTE:** If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.

b. If the switcher is password protected, click in the **`Password`** field and enter the appropriate administrator or user password.

c. Click **`Connect`**. The Extron Matrix Switchers Control Program window appears, displaying the current configuration of the attached matrix (see **figure 18** and **figure 19** on the next page). Proceed to step 4.

- If you logged on using the administrator password or if no password was required, the program connects you to the matrix switcher with all of the administrator rights and privileges..
- If you logged on using the user password, the program connects you to the matrix switcher with only user capabilities.
- If an incorrect password was entered, the program beeps and returns to the password entry display.

4. Use the Matrix Switchers Control Program controls to operate the switcher as desired.

- To create a tie, drag an input box to one or more output boxes. To remove a tie, drag the output box to its tied input box or to the trash can.
- To make the control program easier to use, assign a device icon to each input and output. Click on a box that represents an input or output and drag the desired icon onto the box from the icon palette that appears.
- For quick display of information on a specific input or output device, position the pointer tool over that input or output in the control program window. The program opens a pop-up window that provides details about the connection to that device (see the inset box in **figure 19** on the next page).

> **NOTE:** The matrix size is so large that you need to scroll up and down to see all of the inputs and outputs.

> **TIP:** You can print a map of the current configuration by clicking **`File`** > **`Print Tie Map`**.

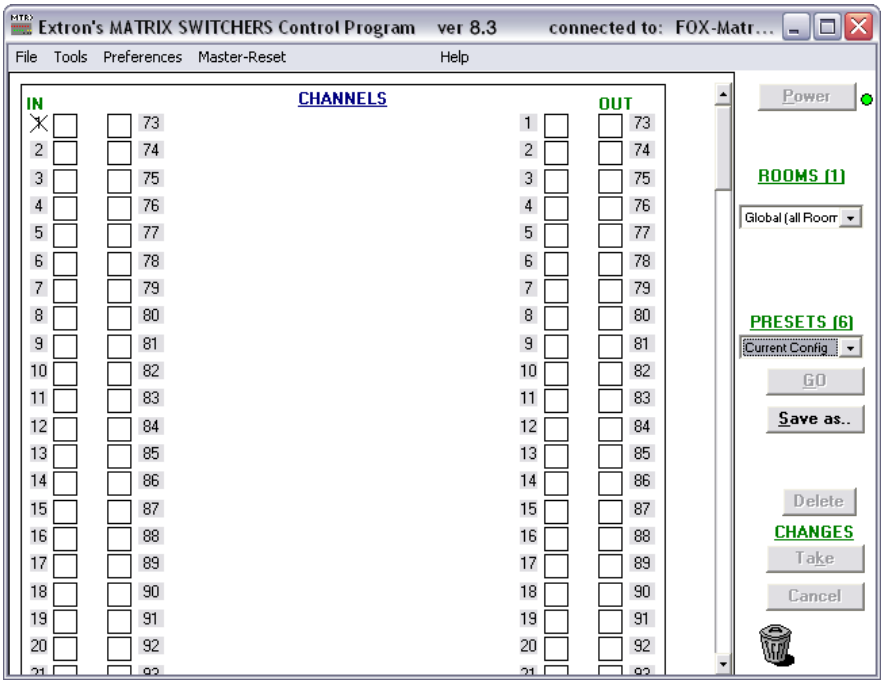


Figure 18. Extron Matrix Switchers Control Program Window (Blank)

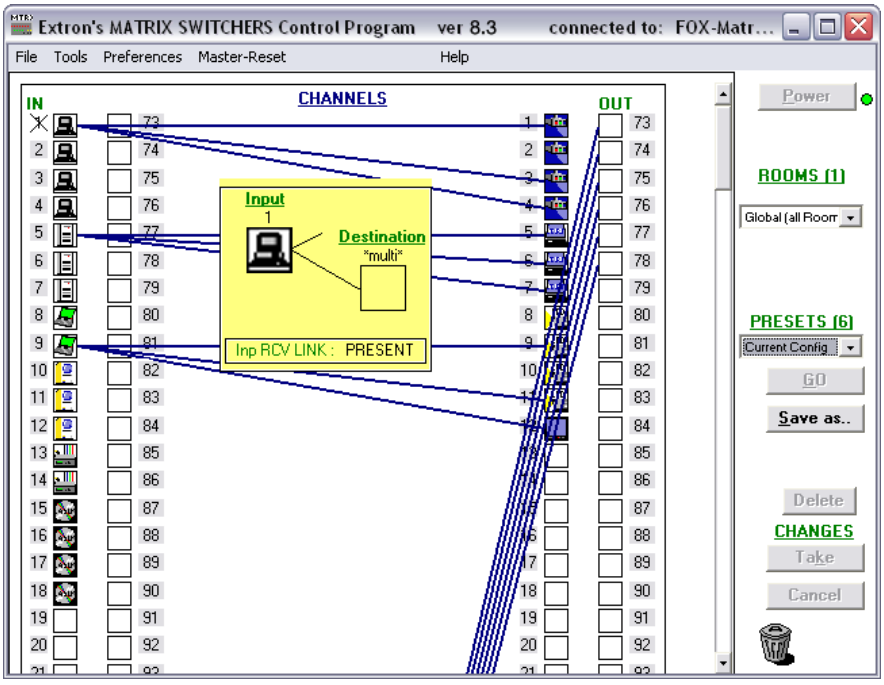


Figure 19. Sample Program Window (Complete)

IP Settings/Options Window

The IP Settings/Options window (click **Tools** > **IP options**, see figure 20) provides a location for viewing and, if connected via either serial port or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See **Ethernet Connection** on page 82 for basic information about IP addresses. None of the fields on this screen can be edited while you are logged on as a user.

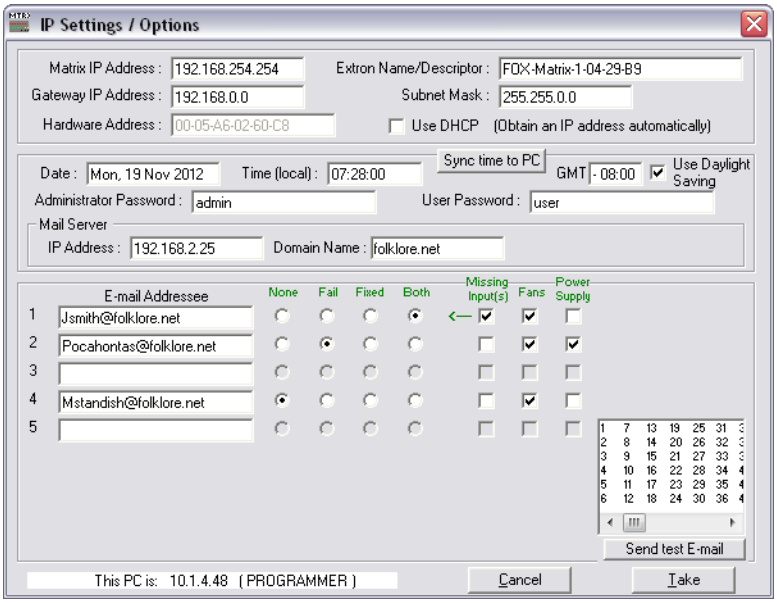


Figure 20. Control Program IP Setting/Options Window

NOTES:

- Editing variables in the IP Settings/Options window while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing the settings on this screen using a serial port and protecting the Ethernet access to this screen by assigning an administrator password to qualified and knowledgeable personnel only.
- When the control program is connected to the switcher via the RS-232 link, the **Administrator Password** and **User Password** fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and change a password in this window without knowing the current password.

Address and Name fields

- The **Matrix IP Address** field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory in the switcher.
- The **Gateway IP Address** field identifies the address of the gateway to the controlling PC to be used if the matrix switcher and the mail server are not on the same subnet.
- The **Subnet Mask** field is used to determine whether the matrix switcher is on the same subnet as the controlling PC when you are subnetting. For more information, see **Subnetting — A Primer** on page 87.
- The **Mail Server IP Address** field displays the IP address of the mail server that handles the e-mail for the facility in which the FOX matrix switcher is installed.

Valid addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called “octets,” separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

The default addresses are as follows, but if these conflict with other equipment at your installation, you can change the addresses to any valid value:

- IP address: 192.168.254.254
- Subnet mask: 255.255.0.0
- Gateway address: 0.0.0.0

NOTES:

- The address fields are unavailable when DHCP is selected.
- Editing the addresses while connected via the Ethernet port can immediately disconnect the user from the FOX matrix switcher. Extron recommends editing this field using one of the serial ports and protecting the Ethernet access by assigning an administrator password to qualified and knowledgeable personnel only.

The **Extron Name/Descriptor** field contains the name of the matrix switcher. This descriptor can be changed to any valid name, up to 24 alphanumeric characters.

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35). In the **Mail Server Domain Name** field, the @ character is acceptable only as the lead-in to the domain name (such as *@folklore.net*).

Edit any of these fields as follows:

1. Click in the desired field. The graphic cursor becomes a text cursor.
2. Edit the address or name as desired.
3. Press the <Tab> key on the keyboard or click in another field to exit the field.
4. Click the **Take** button to make the address change take affect.

Hardware Address field

The hardware (MAC) address is hardcoded in the matrix switcher and cannot be changed.

Use DHCP check box

The **Use DHCP** check box directs the matrix switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). Contact the local system administrator to determine whether to use DHCP.

Date, Time (local), and GMT (offset) fields

The **Date** field displays the current date in the Greenwich Mean Time zone.

The **Time (local)** field displays the current time in the local time zone.

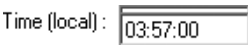
The **GMT** field displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

NOTE: Rather than the following procedure, you can click the **Sync Time to PC** button to set the switcher to the internal time of your computer.

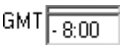
If desired, adjust any of these values as follows:

1. Click in the desired field. The field changes to an editable field appropriate to the value being changed and the graphic cursor becomes a text cursor.
   - The **Date** field becomes a set date field, with the date in the format (M)M/(D)D/YYYY. Leading zeroes are not shown.

   - The **Time (local)** field becomes a set time field, with the time in the format HH:MM:SS (00:00:00 to 23:59:59).

   - The **GMT** field becomes a set offset field, with the offset in the format ±HH:MM (–12:00 to +14:00).

2. Edit the field as desired to set the proper value. For time, remember to use 24-hour time. Leading zeroes are optional.
3. Press the <Tab> key on the keyboard or click in another field to exit the set date field.
4. Click the **Take** button to make the date change take affect.

Sync Time to PC button

Clicking the **Sync Time to PC** button causes the computer you are operating to send its internal time to the switcher in a set time command.

Use Daylight Savings check box

To turn Daylight Saving Time on and off for North America, select the **Use Daylight Saving** checkbox. When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

NOTE: For Daylight Saving Time in Europe and Brazil, see the **Set Daylight Saving Time** SIS command on page 33.

Administrator Password and User Password fields

The **Administrator Password** field displays the password required to log on to the matrix switcher via the Ethernet port with all of the rights and privileges of an administrator. The **User Password** field displays the password required to log on to the matrix switcher via the Ethernet port as a user, without all of the rights and privileges of an administrator. Passwords are case sensitive and are limited to 12 upper-case and lower-case alphanumeric characters.

Both password fields are masked with asterisks (****************) as a security measure.

NOTES:

- Editing the **Administrator Password** field while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing this field using one of the serial ports and protecting the Ethernet access to this screen by assigning an administrator password to qualified and knowledgeable personnel only.
- An administrator password must be created before a user password can be created.
- The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

Edit either password field as follows:

1. Click in the desired **Password** field. The pointer tool becomes a text cursor.
2. Edit the case-sensitive password as desired.
3. Press the <Tab> key on the keyboard or click in another field to exit the **Password** field.
4. Click the **Take** button to make the password change take effect.

Mail Server IP Address field

The **Mail Server IP Address** field displays the IP address of the mail server that handles the e-mail for the facility in which the matrix switcher is installed. Standard IP protocol rules apply to the Mail Server IP address.

Edit this field as follows:

1. Click in the **Mail Server IP Address** field. The pointer tool becomes a text cursor.
2. Edit the IP address as desired.
3. Press the <Tab> key on the keyboard or click in another field to exit the **Mail Server IP Address** field.
4. Click the **Take** button to make the address change take effect.

Mail Server Domain Name field

The **Mail Server Domain Name** field displays the domain name that the matrix switcher uses to log on to the e-mail server. Standard domain conventions (such as *xxx*.com) apply.

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35). In the **Mail Server Domain Name** field, the @ character is only acceptable as the lead-in to the domain name (such as *@folklore.net*).

Edit this field as follows:

1. Click in the **Mail Server Domain Name** field. The pointer becomes a text cursor.
2. Edit the name as desired.
3. Press the <Tab> key on the keyboard or click in another field to exit the **Mail Server Domain Name** field.
4. Click the **Take** button to make the name change take effect.

E-mail Addressee fields

The five E-mail Addressee fields permit the administrator to identify the e-mail addresses of the personnel to whom the matrix switcher e-mails notification of its failure and repair status. Figure 21 shows a typical e-mail from the switcher.

Miles Standish

From:	FOX-Matrix-1-04-29-B9@folklore.net
Sent:	Wednesday, December 5, 2012 11:22 AM
To:	Miles Standish
Subject:	FOX-Matrix-1-04-29-B9 - Fans restored

Wed, 5 Dec 2012 11:22:48
Unit Name = FOX-Matrix-1-04-29-B9
Unit IP Address = 192-168-254-254

Figure 21. Typical E-mail Message from the Switcher

The radio buttons and check boxes associated with each address field permit the administrator to specify e-mail requirements for each recipient.

Edit these fields and controls as follows:

1. Click in the desired **E-mail Addressee** field. The pointer becomes a text cursor.
2. Edit the e-mail address as desired. Standard e-mail address conventions apply (for example: *aaaa@xxx*.com).
3. Press the <Tab> key on the keyboard or click in another field to exit the **E-mail addressee** field.
4. In the square check boxes associated with each addressee, select one or more options about which the addressee is to be e-mailed: missing inputs, fans, and power supply. In the floating box that contains the input numbers, select the inputs to be monitored.
5. In the round radio buttons associated with each addressee, select whether the addressee is to be e-mailed of failures, fixes, both, or not to be notified.
   The **None** radio button is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as when travelling or on vacation.
6. If desired, click the **Send test E-mail** button to test the e-mail function.
7. Click the **Take** button to make the e-mail address changes take effect.

Updating Firmware

The firmware upgrade utility provides a way to replace the firmware that is coded on the control board of the switcher without taking the switcher out of service.

NOTE: Upgrading the firmware does not overwrite the current configuration or presets.

Update the switcher firmware as follows:

1. Perform steps 1 through 5 of **Installing the Software**, on page 38, to download the firmware upgrade from the Extron website.
2. Click **Run** in the File Download and Security Warning dialog boxes (see **figure 22** on the next page). The PC extracts the firmware update received from the Extron website and starts the Extron Installation Program to extract the firmware file.
3. Click **Next** in the Firmware Upgrade window. The program extracts the firmware files and places them in a folder identified in the InstallShield Wizard window.

   ATTENTION: The firmware file must have an .s19 extension. Other file types can cause the switcher to stop functioning.

   NOTES:
   - **Note the folder to which the firmware file is saved**. When downloaded from the Extron website, the firmware is placed in a subfolder of:
     - **Windows 7 or Windows 8**: `C:\Program Files (x86)\Extron\Firmware`.
     - **Older versions**: `C:\Program Files\Extron\Firmware`.
   - The original factory-installed firmware is permanently available on the matrix switcher. If the attempted firmware upload fails, the switcher reverts to the factory-installed firmware.
4. Click **Finish** in the Firmware Upgrade window to exit the program.

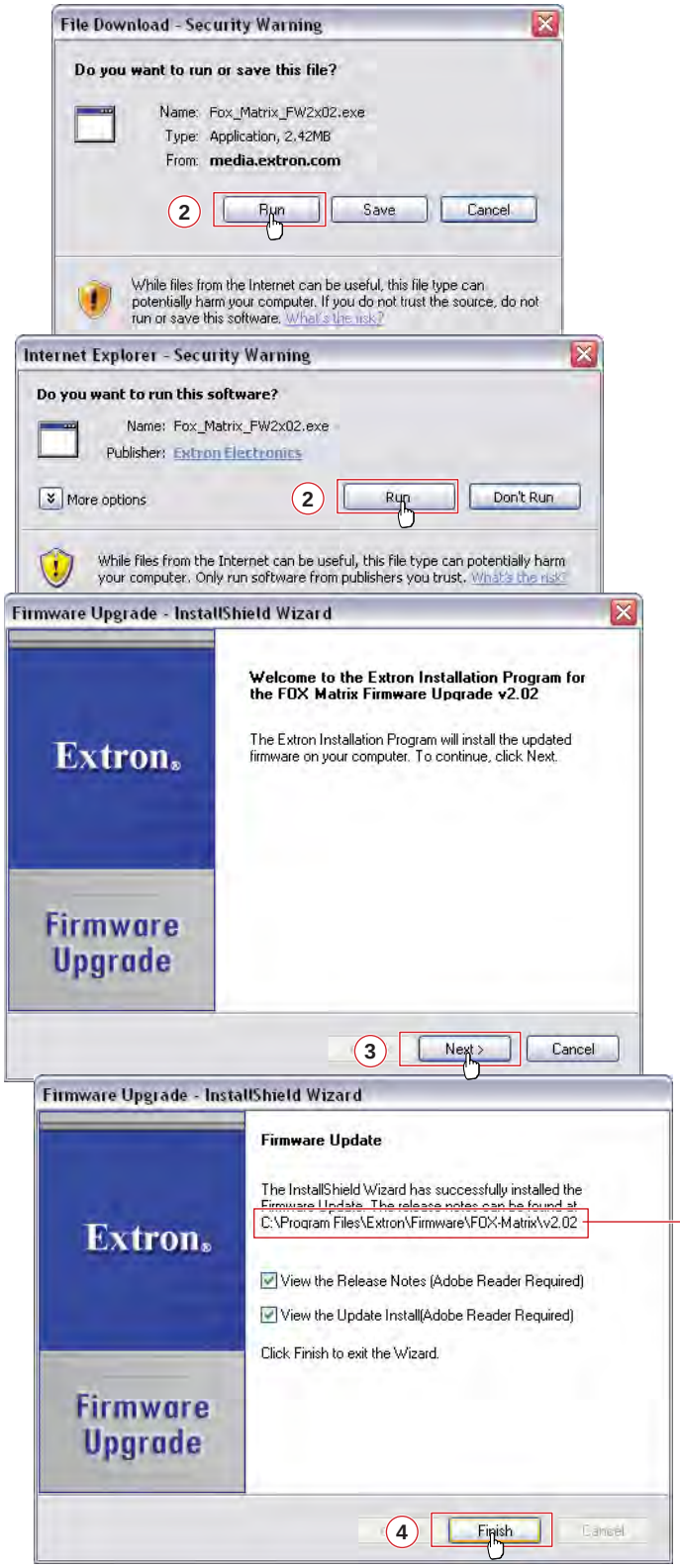

File Download - Security Warning
Do you want to run or save this file?
Name: Fox_Matrix_FW2x02.exe
Type: Application, 2.42MB
From: media.extron.com
2
Run
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?
Internet Explorer - Security Warning
Do you want to run this software?
Name: Fox_Matrix_FW2x02.exe
Publisher: Extron Electronics
More options
2
Run
Don't Run
While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?
Firmware Upgrade - InstallShield Wizard
Extron
Firmware Upgrade
Welcome to the Extron Installation Program for the FOX Matrix Firmware Upgrade v2.02
The Extron Installation Program will install the updated firmware on your computer. To continue, click Next.
3
Next >
Cancel
Firmware Upgrade - InstallShield Wizard
Extron
Firmware Upgrade
Firmware Update
The InstallShield Wizard has successfully installed the Firmware Update. The release notes can be found at
C:\Program Files\Extron\Firmware\FOX-Matrix\v2.02
View the Release Notes (Adobe Reader Required)
View the Update Install(Adobe Reader Required)
Click Finish to exit the Wizard.
4
Finish
Cancel
Folder Where Firmware is Installed.

Figure 22. Downloading Firmware Upgrade Files

5. Connect a computer that runs the Windows operating system to a switcher serial port, the USB port (FOX Matrix 320x, see **item ②**, the Configuration port, on page 17) or the switcher LAN port (see **item ④**, the Ethernet Port, on page 14).
6. Start the Matrix Switchers Control Program and connect to the matrix switcher (see **Using the Matrix Switcher Control Software**, steps 1 through 4, starting on page 39).
7. Click **`Tools`** > **`Update`** firmware.
   - **If the switcher is connected via the LAN port**, the Select Files window appears (see figure 23). Perform "Ethernet-connected firmware upload," below.

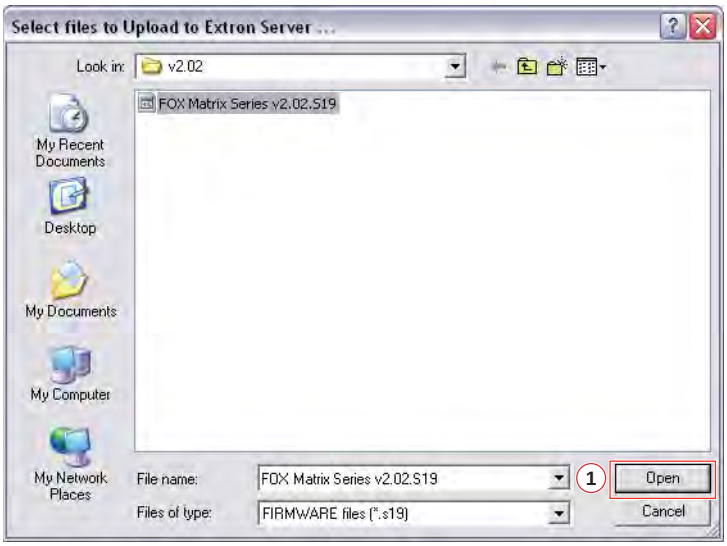


Figure 23. Select Files Window

   - **If the switcher is connected via either serial port**, the Extron Firmware Loader opens (see **figure 24** on the next page). Perform **Serial-port-connected firmware upload**, beginning on the next page.

Ethernet-connected firmware upload

1. Navigate to the folder where you saved the firmware upgrade file (see figure 23, above). Select the file.
2. Click the **`Open`** button. The software advises you that you are about to reprogram the switcher firmware. Click **`OK`** to continue.

   A status window, which shows the progress of the upload, appears. The firmware upload to the FOX matrix switcher may take a few minutes.

Serial-port-connected firmware upload

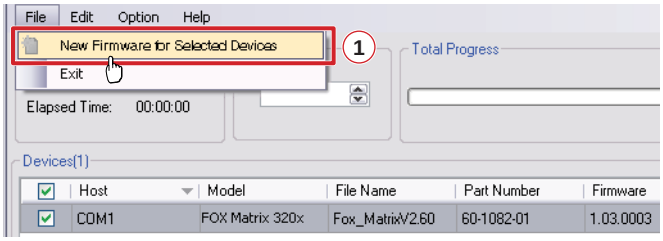


Figure 24. Extron Firmware Loader Window

1. Select the FOX matrix switcher and click **File** > **New Firmware for Selected Devices**. The Choose Firmware File dialog box opens (see figure 25).

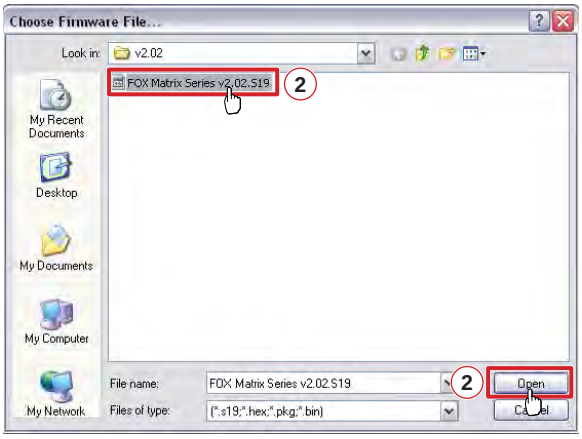


Figure 25. Choose Firmware File Window

2. Navigate to and select the new firmware file. Click **Open**. The Choose Firmware File window closes.
3. In the Firmware Loader window, click **Begin** (see figure 26).

   The Total Progress and Progress status bars show the upload progress. The firmware upload may take several minutes. Once the status bars have progressed from **0%** to **100%**, and Status is listed as **Complete**, the firmware loader utility resets the switcher.

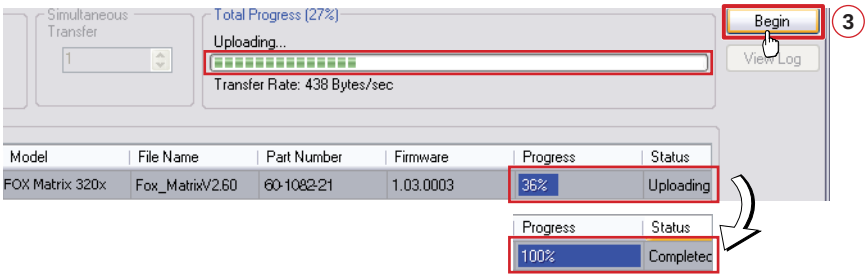


Figure 26. Firmware Loader Screen

4. Click **Exit** to close the Firmware Loader.

NOTE: The firmware loader increases the baud rate to 115,200. The firmware loader may not return the serial port to its earlier baud rate, making communications with the switcher impossible. If you cannot communicate with the switcher after a firmware upload, change the baud rate on your computer and, if necessary, change the baud rate using the **Set serial port parameters** SIS command on page 34.

Uploading HTML Files

You can create customized HTML pages for the switcher to display. The `HTML Files List` window (see figure 27), accessible via the **`Tools`** menu, provides a way to view the contents of the file system of the switcher and upload custom HTML pages to the switcher.

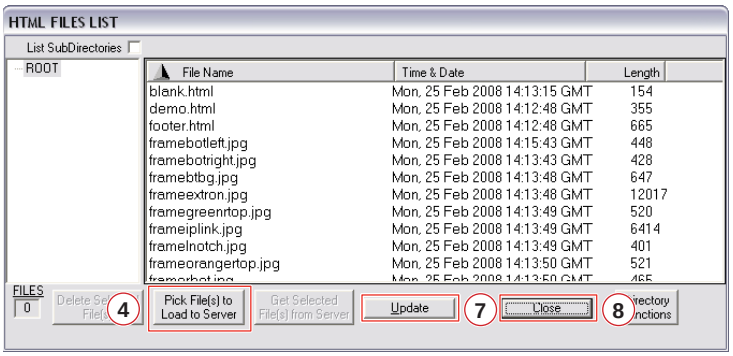

HTML FILES LIST
List SubDirectories
ROOT
File Name
Time & Date
Length
blank.html Mon, 25 Feb 2008 14:13:15 GMT 154
demo.html Mon, 25 Feb 2008 14:12:48 GMT 355
footer.html Mon, 25 Feb 2008 14:12:48 GMT 665
framebotleft.jpg Mon, 25 Feb 2008 14:15:43 GMT 448
framebotright.jpg Mon, 25 Feb 2008 14:13:43 GMT 428
framebtbg.jpg Mon, 25 Feb 2008 14:13:48 GMT 647
frameextron.jpg Mon, 25 Feb 2008 14:13:48 GMT 12017
framegreenrtop.jpg Mon, 25 Feb 2008 14:13:49 GMT 520
frameiplink.jpg Mon, 25 Feb 2008 14:13:49 GMT 6414
framelnotch.jpg Mon, 25 Feb 2008 14:13:49 GMT 401
frameorangertop.jpg Mon, 25 Feb 2008 14:13:50 GMT 521
FILES
0
4
Pick File(s) to Load to Server
Get Selected File(s) from Server
Update
7
Close
8

Figure 27. HTML Files List Window

Upload HTML pages as follows:

NOTES:

- The files listed in figure 27 are shown for example only and may not be present on your switcher.
- The HTML Files List window is for inserting your own HTML pages. This is not the window to replace the firmware that controls all switcher operation. See **Updating Firmware**, on page 47, to replace the firmware.
- The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

1. Connect the PC to the matrix switcher via any of the serial ports or the Ethernet port of the switcher.
2. Start the Matrix Switchers Control Program and connect to the FOX matrix switcher (see **Using the Matrix Switcher Control Software**, steps 1 through 4, starting on page 40).
3. Click **`Tools`** > **`HTML File Manager`**.
4. Click the **`Pick File(s) to Load to Server`** button. An `Open File` dialog box opens.
5. Navigate to the folder where you saved the HTML files. Select the files.

   NOTES:

   - To select multiple files, hold the <Ctrl> key while you select the desired files.
   - If you want one of the HTML files that you created to be the default start-up page, name the file “index.html.” The FOX matrix switcher automatically looks for that file name when you first connect to it using an Internet browser.

6. Click the **`Open`** button. Uploading the files to the FOX matrix switcher may take a few minutes.
7. Click the **`Update`** button to confirm the upload.
8. Click the **`Close`** button to exit the HTML Files List window.

Windows Buttons, Drop Boxes, and Trash Can

The buttons, drop boxes, and trash can on the right side of the Matrix Switchers Control Program window perform the following functions:

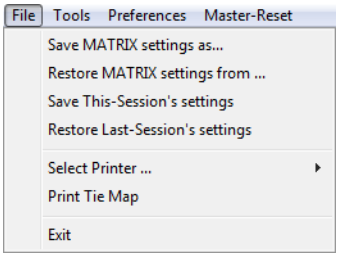
- **Power** — Unavailable for FOX matrix switchers.
- **Rooms menu** — Displays a list of up to 10 rooms. You can select a room from the list to display it in the window.

  NOTE: A *room* is a subset of outputs that the operator logically relate to each other. The FOX matrix switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.

- **Presets menu** — Displays a list of up to 64 global presets and up to 100 room presets (10 rooms x 10 presets per room). You can select a preset from the list to display it in the window and either activate it (**Go**) or delete it (**Delete**).
- **Go** — Activates the selected preset as the current configuration.
- **Save as ...** — Allows the current set of ties to be saved as a preset. Enter the preset number when prompted to do so.
- **Delete** — Allows the current preset to be deleted.
- **Changes – Take** — Allows you to execute any potential changes made to the displayed configuration.
- **Changes – Cancel** — Returns to the previous screen, undoing any changes you have made.
- **Trash can** — Drag and drop from an input or output button to the trash can to erase all ties associated with that input or output.

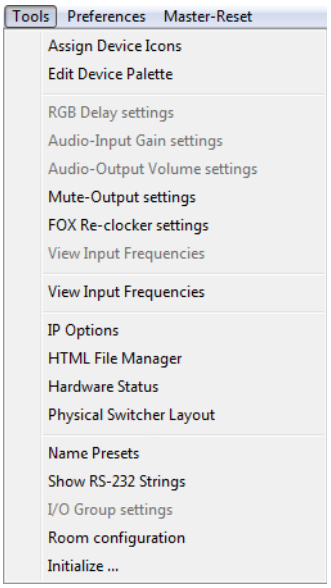
Windows Menus

File menu



- **Save Matrix settings as ...** — Saves a complete set of up to 64 presets, rooms, room presets, and preset names plus the last active setting (preset 0), to a file. Saved settings include assigned icons and icon captions.
- **Restore Matrix settings from ...** — Loads and activates a previously saved setting file.
- **Save This-Session's settings** — Saves the current assigned icons and icon captions.
- **Restore Last-Session's settings** — Loads the icons and icon captions that were saved during the last session. If you saved changes from the previous session to disk the last time you exited the program, the ties from that session are also loaded.
- **Select printer ...** — Selects the target printer.
- **Print tie map** — Prints the tie set that is displayed on the screen.
- **Exit** — Closes the Matrix Switchers Control Program.

Tools menu



- **`Assign Device Icons`** — Displays the complete set of input and output device icons. You can drag any of these icons to the input and output boxes.
- **`Edit Device Palette`** — Allows you to add your own device icon graphics.
- **`Mute-Outputs settings`** — Displays the Mute Adjust window, from which you can mute each output.
- **`FOX Re-clocker settings`** — Displays the FOX Reclocking Rate Settings window, from which you can select the reclocking rate for one or all outputs and mute and unmute the output.
- **`View Input Frequencies`** — Displays the Input Detection window, which shows the data rates for SDI and HD-SDI inputs only. This selection is not available if no BNC 3G/HD/SD-SDI I/O boards are installed.
- **`Update Firmware ...`** — Allows you to replace the firmware that is coded on the control board of the switcher without taking the switcher out of service (see **Updating Firmware** on page 47).
- **`IP Options`** — Allows you to set IP options (see **IP Settings/Options Window** on page 43).
- **`HTML file manager`** — Displays a list of HTML files installed on the switcher and allows you to upload custom files from a PC connected to the switcher (see **Uploading HTML files** on page 51).
- **`Hardware status`** — Provides an overall view of the status of the matrix switcher, including the power supply voltages, the internal temperature, the Remote RS-232/RS-422 port configuration, and the installed and updated firmware status (see figure 28).

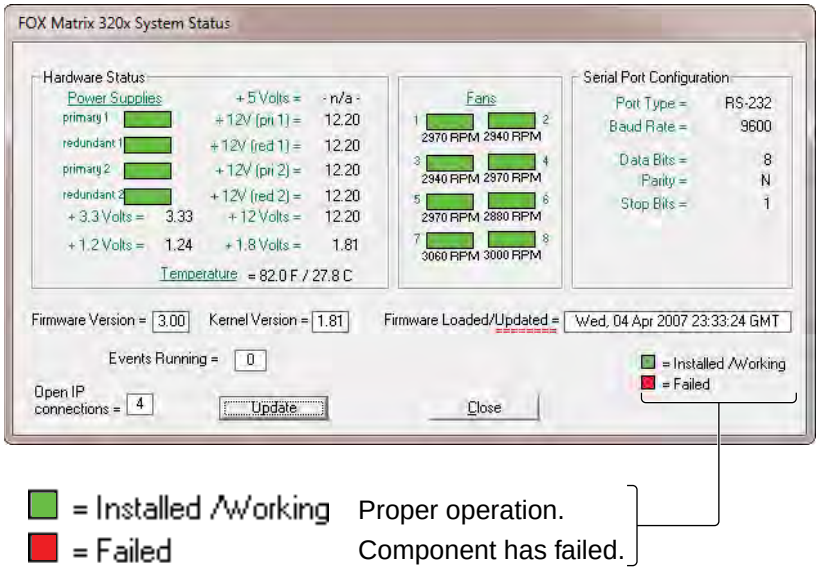


Figure 28. Status Window

- **Physical Switcher Layout** — Calls the FOX matrix switcher Physical Configuration window (see figure 29), which displays the I/O board type installed in each slot. The Channels field can be helpful in identifying a specific input or output. In figure 29, for example, input 49 is identified as slot 4, input transceiver 1 (4i01).

Figure 29. Physical Configuration Window

- **Name Presets** — Allows you to assign a name to each of the 64 global presets and 100 room presets.

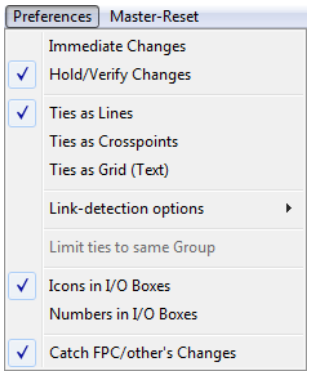
  NOTE: Preset names are limited to 12 upper- and lower-case alphanumeric characters, <space>, _, and / characters. The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

- **Show RS-232 Strings** — Displays the ASCII commands that are used by the current configuration. You can refer to these for SIS programming.
- **Room configuration** — Allows you to assign outputs to or delete outputs from rooms.

  NOTE: A *room* is a subset of outputs that are logically related to each other, as determined by the operator. The FOX matrix switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.

- **Initialize …** — Initializes and clears any or all of the following: ties, presets, preset names, icon names, and icons.

Preferences menu



- **Immediate Changes** — Causes configuration changes to take effect immediately.
- **Hold/verify Changes** — Delays implementation of configuration changes until the Changes – **Take** button is clicked.
- **Ties as Lines** — Displays ties as lines (see figure 30).

Figure 30. Ties Shown as Lines

- **Ties as Crosspoints** — Displays ties as a matrix of inputs and outputs (see figure 31). Ties that have been made are indicated as amber or green boxes. Ties that will take effect when you click the **Take** button are indicated by +. Ties that will be broken when you click the **Take** button are indicated by –.

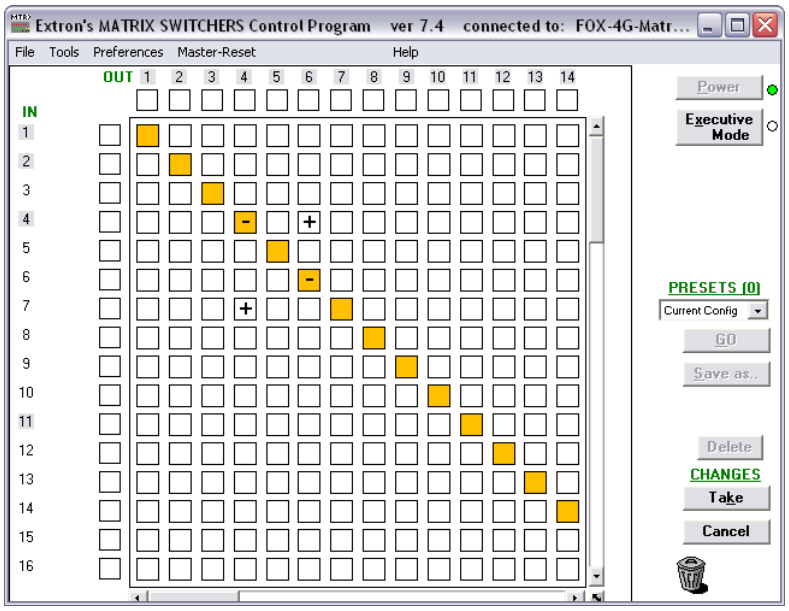

Extron's MATRIX SWITCHERS Control Program ver 7.4 connected to: FOX-4G-Matr...
File Tools Preferences Master-Reset Help
OUT 1 2 3 4 5 6 7 8 9 10 11 12 13 14
IN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Power
Executive Mode
PRESETS (0)
Current Config
GO
Save as...
Delete
CHANGES
Take
Cancel

Figure 31. Ties Shown as Crosspoints

- **Ties as Grid** (available for FOX Matrix 320x only)— Displays ties as a grid of outputs and inputs (see figure 32) that allows you to click an output and type the desired input. Ties that have been made are indicated in black and white. Ties that will take effect or be broken when you click the **Take** button are indicated in red or gray.

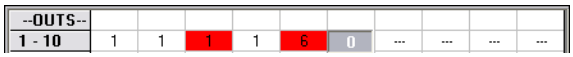
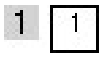


Figure 32. Ties Shown in a Grid

- **Link-detection options** — Allows you to set the link detection feature as follows:
  - To automatically refresh the display every 10 seconds
  - To update the display whenever you refresh the screen
  - To never sample and display the link status

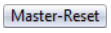
- **Icons in I/O Boxes** — Erases any numbers in the I/O boxes in either the ties-as-lines window or the ties-as-boxes display (see **figure 18** on page 42). You can place icons in the boxes.

- **Numbers in I/O Boxes** — Erases any icons in the I/O boxes in either the ties-as-lines window or the ties-as-boxes display and fills each box with the associated input or output number.



- **Catch FPC/other's changes** — When checked, sets the switcher to report all configuration and setting changes to the serial port or Ethernet connection that turned this selection on. These reports allow the Matrix Switchers Control Program to track the changes that occur in the configuration and settings of the switcher, whether commanded via either serial port or the Ethernet port.

Master-Reset selection



Master reset performs all of the following functions:

- Clears all ties
- Clears all presets
- Clears all rooms
- Clears all output mutes

NOTE: Master reset does not reset the Internet protocol (IP) settings.

Using Emulation Mode

Emulation mode allows you to set up the software without connecting the switcher. Use emulation mode as follows:

1. To run the Matrix Switchers Control Program, click **Start** > **Programs** > **Extron Electronics** > **Matrix Switchers** > **MATRIX Switcher + Control Pgm**.

   The Comm Port Selection window (see figure 33) appears.

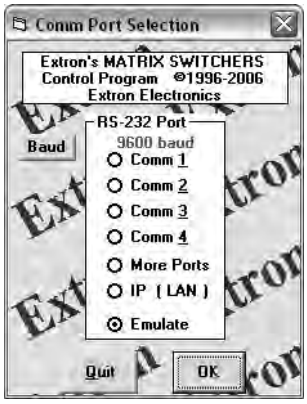


Figure 33. Comm Port Selection Window

2. Choose **Emulate**, and click **OK**.
3. Choose an emulation file to open, and click **OK**. The file DEMO.MTX provides a sample of a completed matrix setup. Selecting the file NEW.INI or clicking **Cancel** provides a blank setup window to get you started.

4. Enter the file name under which you want to save any changes to the file, and click **OK**.
5. Select **Fiber Matrix** as the Matrix Model, **320x** or **14400** as the Default Size, and either **singlemode** or **multimode** for each board installed (see figure 34). Click **OK**.

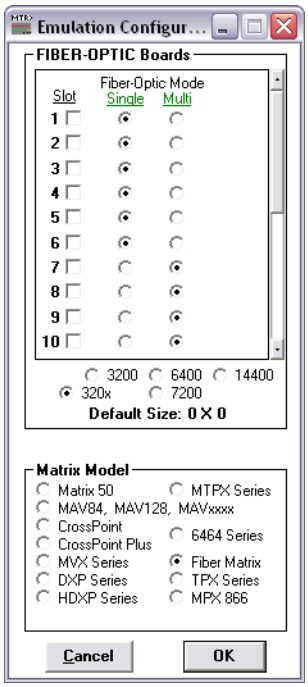


Figure 34. Emulate Configuration Dialog Box

6. Continue using the program as described on **page 41**.

Using the Help System

For information about program features, you can access the help program in any of the following ways:

- From the Extron Electronics program folder or group, double-click the MATRIX Switcher Help icon (shown at right).
- From within the Matrix Switchers Control Program, click **Help** > **Contents** on the menu bar.
- From within the Matrix Switchers Control Program, press the keyboard <F1> key.

HTML Operation

This section introduces using the built-in HTML pages to operate the FOX Matrix Switchers, including:

- **Opening the Embedded Web Pages**
- **Status Tab**
- **Configuration Tab**
- **File Management Tab**
- **Control Tab**

The switcher can be controlled and operated through its LAN port, connected via a LAN or WAN, using a web browser such as Microsoft® Internet Explorer®. The browser display of the status or operation of the switcher has the appearance of web pages. This section describes the factory-installed HTML pages, which are always available and cannot be erased or overwritten.

NOTE: If your Ethernet connection to the matrix switcher is unstable, try turning off the proxy server in your web browser. In Internet Explorer, click **Tools** > **Internet Options** > **Connections** > **LAN Settings**, uncheck the **Use a proxy server...** box, and then click **OK**.

Opening the Embedded Web Pages

Access the switcher using HTML pages as follows:

1. Start the web browser program.
2. Click in the **Address** field of the browser.
3. Enter the Matrix IP address in the **Address** field of the browser.

   NOTE: If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.

4. If you want the browser to display a page other than the default page (such as a custom page that you have uploaded), enter a slash (/) and the name of the file to open.

   NOTES:

   - The **Address** field of the browser should display the address in the following format: <*xxx.xxx.xxx.xxx*>/<*optional_file_name*>.html.
   - The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

5. Press the keyboard <Enter> key. The switcher checks to see if it is password protected.

   If the switcher is not password protected, it checks and downloads the HTML pages (proceed to step 7).

   If the switcher is password protected, the switcher downloads the Windows Security dialog box (see figure 35).

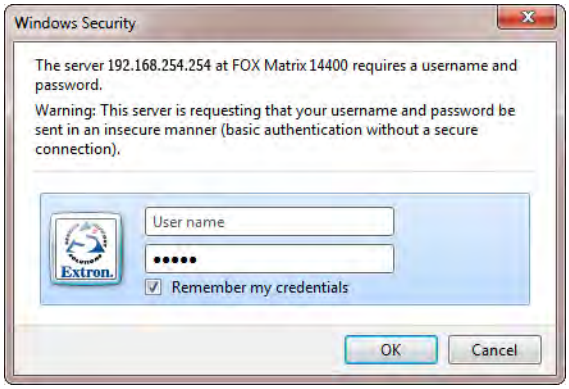

Windows Security
The server 192.168.254.254 at FOX Matrix 14400 requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name
Extron
Remember my credentials
OK
Cancel

Figure 35. Windows Security Dialog Box

NOTE: A **User name** entry is not required.

6. Click in the **Password** field and type in the appropriate administrator or user password. Click the **OK** button.

7. The switcher checks several possibilities, in the following order, and then responds accordingly:
   - Does the address include a specific file name, such as `192.168.254.254/<file_name>.html`?
     If so, the switcher downloads that HTML page.
   - Is there a file in the memory of the switcher that is named “index.html”?
     If so, the switcher downloads “index.html” as the default startup page.
   - **If neither of the above conditions is true**, the switcher downloads the factory-installed default startup page, “nortxe_index.html” (see figure 36), also known as the System Status page.

Status Tab

System Status Page

The System Status page (see figure 36) provides an overall view of the status of the matrix switcher, including power supply status, individual voltages, and fan status. The System Status page is the default page that the switcher downloads when you connect to the switcher. Access the System Status page from other pages by clicking the **`Status`** tab.

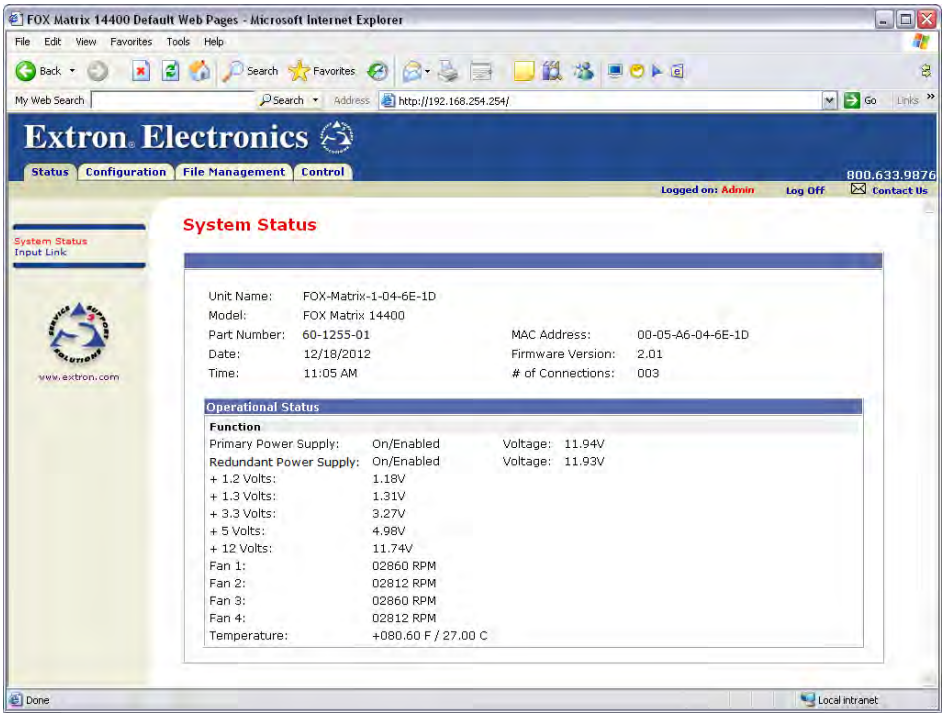


Figure 36. System Status Page

The status web page periodically updates itself to reflect the latest status of the switcher components. If a value changes, the display shows the change in status the next time it updates.

Input Link Page

You can view the status of each I/O board slot on the Input Link page (see figure 37). Click the **Input Link** link to the left of the Status page to download the Input Link page. The Input Link page automatically updates itself every 30 seconds to show the latest status of installed boards, LC connector installation, and input signal presence.

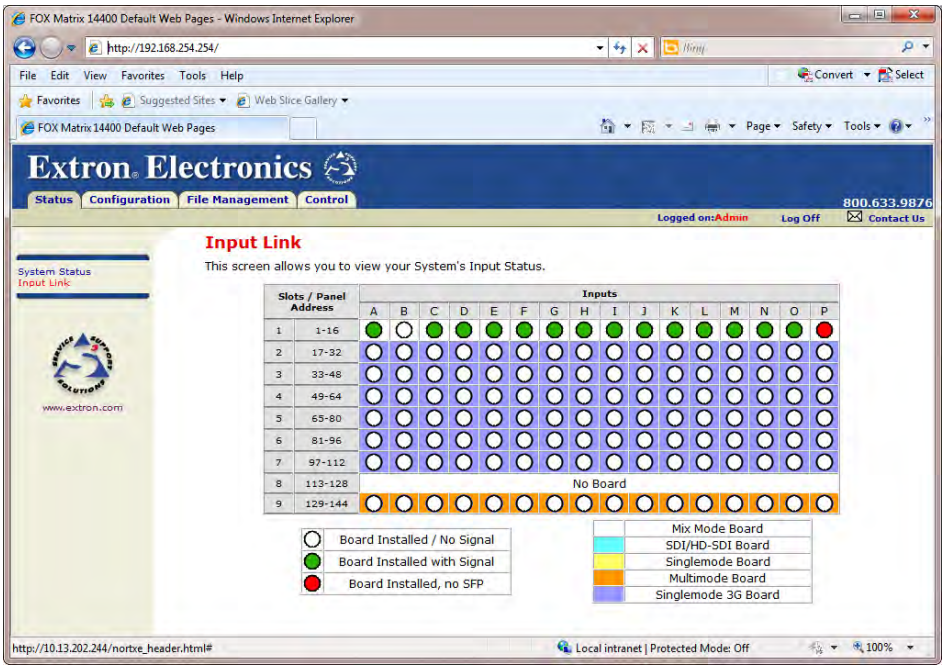


Figure 37. Input Link Page

Configuration Tab

System Settings Page

The FOX Matrix switcher downloads the System Settings page (see figure 38) when you click the **Configuration** tab. The screen consists of fields in which you can view and edit IP administration and system settings. You can access the Email Settings and Passwords pages by clicking the appropriate link. See **Ethernet Connection** on page 82 for basic information about IP addresses and subnetting.

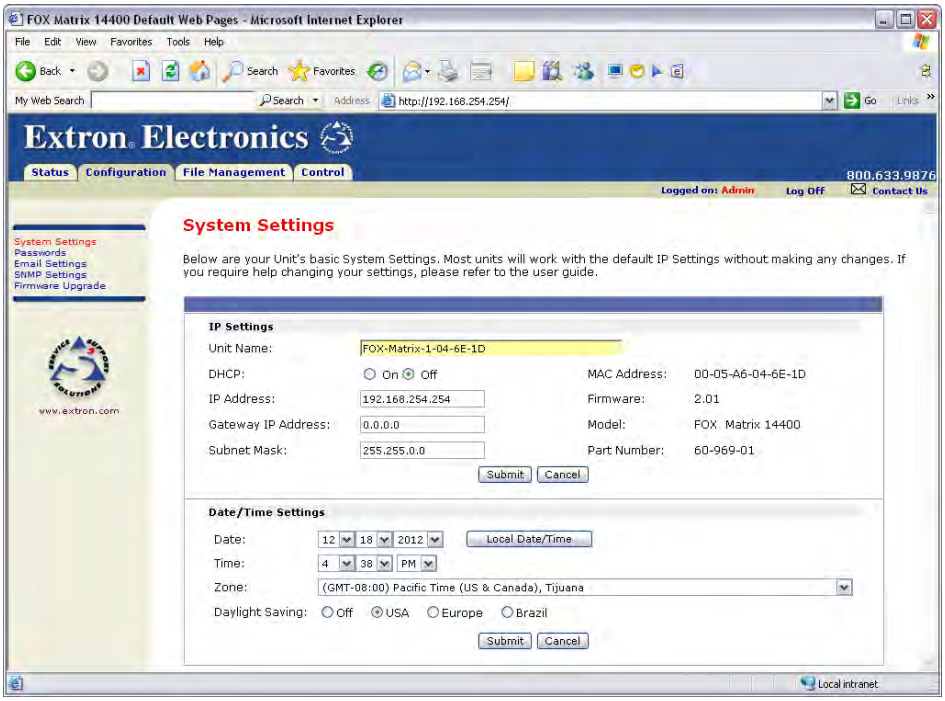

FOX Matrix 14400 Default Web Pages - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
My Web Search Search Address http://192.168.254.254/ Go Links
Extron Electronics
Status Configuration File Management Control
800.633.9876
Logged on: Admin Log Off Contact Us
System Settings
Passwords
Email Settings
SNMP Settings
Firmware Upgrade
www.extron.com
System Settings
Below are your Unit's basic System Settings. Most units will work with the default IP Settings without making any changes. If you require help changing your settings, please refer to the user guide.
IP Settings
Unit Name: FOX-Matrix-1-04-6E-1D
DHCP: On Off
IP Address: 192.168.254.254
Gateway IP Address: 0.0.0.0
Subnet Mask: 255.255.0.0
MAC Address: 00-05-A6-04-6E-1D
Firmware: 2.01
Model: FOX Matrix 14400
Part Number: 60-969-01
Submit Cancel
Date/Time Settings
Date: 12 18 2012 Local Date/Time
Time: 4 38 PM
Zone: (GMT-08:00) Pacific Time (US & Canada), Tijuana
Daylight Saving: Off USA Europe Brazil
Submit Cancel
Local intranet

Figure 38. System Settings Page

On password-protected connections, there are two levels of protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can create ties, create and recall presets, set output mutes, and view all settings with the exception of passwords.

IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings in this field, click the **Submit** button at the bottom of the field.

Unit Name field

The **Unit Name** field contains the name used as the "from" information when the switcher e-mails notification of its failed or repaired status. This name field can be changed to any valid name, up to 24 alphanumeric characters.

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

DHCP radio buttons

The **DHCP On** radio button directs the switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). The **DHCP Off** radio button turns DHCP off. Contact the local system administrator to determine if DHCP is appropriate.

IP Address field

The **IP Address** field contains the IP address of the connected switcher. This value is encoded in the flash memory of the switcher.

Standard IP protocol consists of addresses comprised of four 1-, 2-, or 3-digit numeric subfields, properly called “octets”, separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

The factory-installed default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

NOTE: IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.

Gateway IP Address field

The **Gateway IP Address** field identifies the address of the gateway to the mail server to be used if the switcher and the mail server are not on the same subnet.

The gateway IP address has the same validity rules as the system IP address.

Subnet Mask field

The **Subnet Mask** field is used to determine whether the switcher is on the same subnet as the mail server when you are subnetting. For more information, see **Subnetting — A Primer** on page 87.

MAC Address

The Media Access Control (MAC) Address is hardcoded in the switcher and cannot be changed.

Firmware field

The **Firmware** field identifies the installed firmware version. This field is hardcoded in the switcher and cannot be changed.

Model field

The **Model** field identifies the switcher as a FOX Matrix 320x or FOX Matrix 14400. This field is hardcoded in the switcher and cannot be changed.

Part Number field

The **Part Number** field identifies the part number of your switcher. This field is hardcoded in the switcher and cannot be changed.

Date/Time Settings fields

The **Date/Time Settings** fields (see figure 39) provide a location for viewing and setting the time functions.

Figure 39. Date/Time Settings Fields

To sync the switcher clock to the connected PC, simply click the **Local Date/Time** button and then click the **Submit** button.

NOTE: Use of the **Local Date/Time** button has no effect on the Zone and Daylight Savings functions.

For more complete control of the date and time settings, change the settings as follows:

1. Click the drop box for the variable to be changed. The adjustable variables are month, day, year, hours, minutes, AM/PM, and (time) zone. A drop-down scroll box appears (the year drop box is selected in figure 39).
2. Click and drag the slider or click the scroll up button or the scroll down button until the desired variable is visible.
3. Click the desired variable.

NOTES:

- If setting the time, set the local time. The Zone variable allows you to then enter the offset from Greenwich Mean Time (GMT).
- The **Zone** field identifies the standard time zone selected and displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

4. Repeat steps **1** through **3** for other variables that need to be changed.
5. If appropriate, select the appropriate **Daylight Saving** radio button to turn on the daylight savings time feature for your region or nation.

NOTE: When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

6. Click the **Submit** button at the bottom of the Date/Time Settings area.

Passwords Page

Access the Passwords page (see figure 40) by clicking the **Passwords** link on the System Settings page.

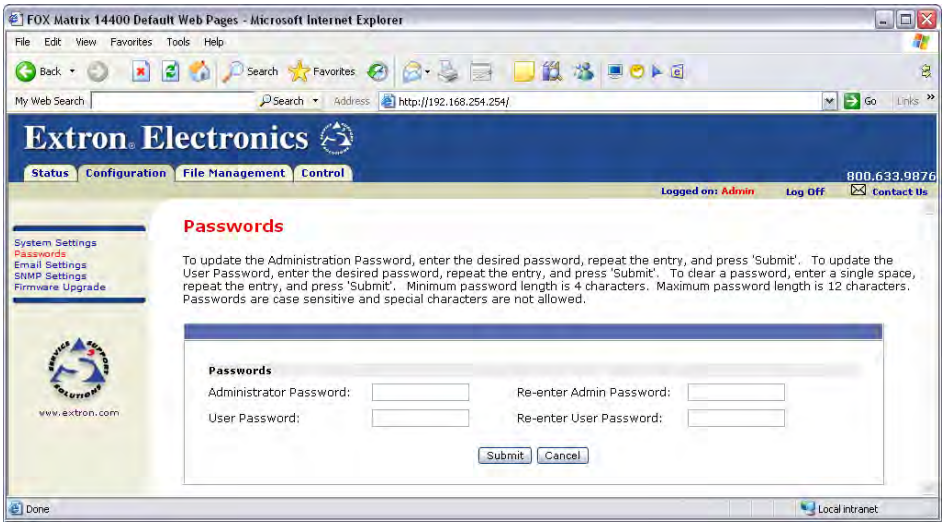

FOX Matrix 14400 Default Web Pages - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
My Web Search Search Address http://192.168.254.254/ Go Links
Extron Electronics
Status Configuration File Management Control
800.633.9876
Logged on: Admin Log Off Contact Us
System Settings
Passwords
Email Settings
SNMP Settings
Firmware Upgrade
www.extron.com
Passwords
To update the Administration Password, enter the desired password, repeat the entry, and press 'Submit'. To update the User Password, enter the desired password, repeat the entry, and press 'Submit'. To clear a password, enter a single space, repeat the entry, and press 'Submit'. Minimum password length is 4 characters. Maximum password length is 12 characters. Passwords are case sensitive and special characters are not allowed.
Passwords
Administrator Password:
Re-enter Admin Password:
User Password:
Re-enter User Password:
Submit Cancel
Done
Local intranet

Figure 40. Passwords Page

NOTE: If the switcher is password protected, fields on this page can be edited only by personnel logged in as administrators.

The fields on the Passwords page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to 12 upper-case and lower-case alphanumeric characters. Each password must be entered twice: once in the **Password** field and then again in the **Re-enter Password** field. Characters in these fields are masked by asterisks (*****). If you do not want to password protect an access level, leave the **Password** field and the **Re-Enter Password** field blank. After entering the desired password in both fields, click the **Submit** button.

NOTE: An administrator password must be created before a user password can be created.

To clear an existing password so that no password is required, enter a single space character in the **Password** and **Re-enter Password** fields, and click the **Submit** button.

Resetting a password

Reset an existing password so that no password is required as follows:

1. Clear any existing password in both the **Password** and **Re-enter Password** fields.
2. Tap the <space> bar once to enter a single ASCII space character in both the **Password** and **Re-enter Password** fields.
3. Click the **Submit** button.

Email Settings Page

Access the Email Settings page (see figure 41) by clicking the **Email Settings** link on the System Settings page. The Email Settings page has fields for setting up the e-mail notification capabilities of the switcher. For the e-mail settings and for each row of the e-mail notification settings, click the **Edit** button to make the fields available for editing. The button changes to **Save**. After editing the associated settings with, click the **Save** button.

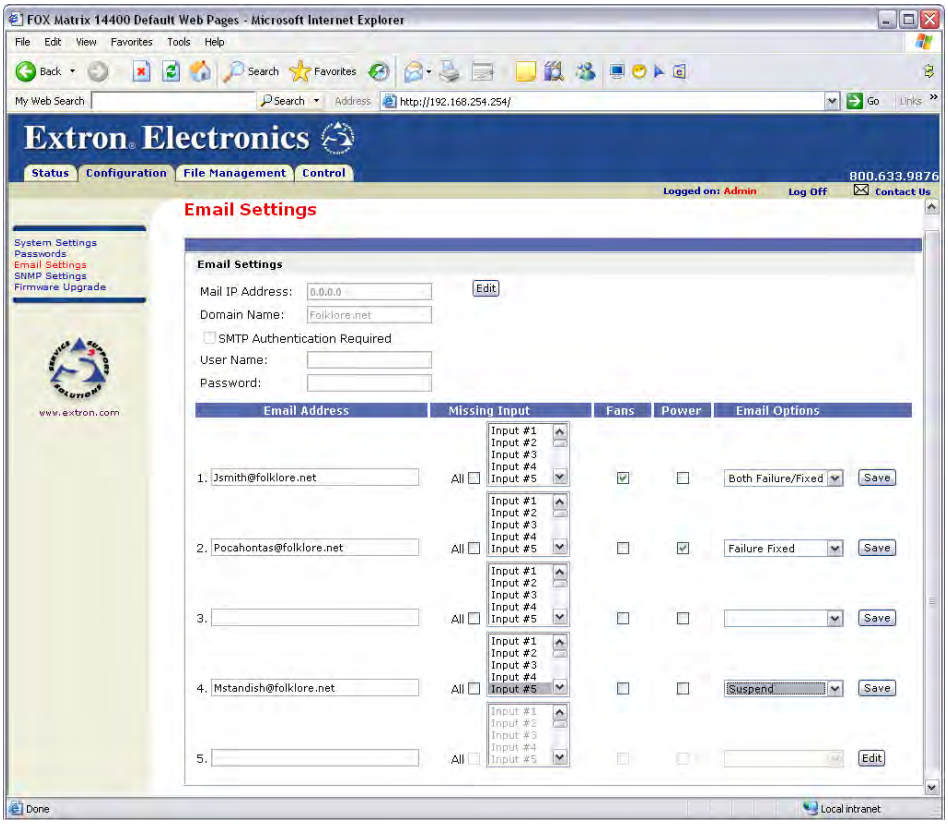


Figure 41. Email Settings Page

Mail IP Address field

The **Mail IP Address** field displays the IP address of the e-mail server for the facility in which the FOX matrix switcher is installed. Standard IP protocol rules apply to the **Mail IP address** field.

Domain Name field

The **Domain Name** field displays the domain name that the FOX matrix switcher uses to log on to the e-mail server. Standard domain name conventions (for example: *xxx*.com) apply.

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35). The @ character is acceptable only as the lead-in to the domain name (such as @folklore.net).

Setting up SMTP authorization

If desired, set the FOX Matrix Switcher to require SMTP authorization before accepting any e-mail as follows:

1. Click **Edit**. The button changes to **Save**.
2. Check the **SMTP Authorization Required** check box, located below the **Domain Name** field. This enables the **User Name** and **Password** fields below the check box.
3. Enter a user name and a password in the **User Name** and **Password** fields. For the FOX Matrix Switcher to accept their e-mail messages, senders must enter the user name and password.

   NOTES:

   - For the User name, any combination of letters, numerals, spaces, and symbols except the comma (,) and the single and double quotation marks (' and ") are valid. For the password, all characters except the comma are valid. The user name and password can each be from 1 to 30 characters.
   - Both a user name and a password must be specified.

4. Click Save to save the user name and password.

Deselecting SMTP authorization

Remove SMTP authorization as follows:

1. Click **Edit**. The button changes to **Save**.
2. Click (deselect) the **SMTP Authorization Required** check box.
3. Click **Save**.

Email Address fields

The five **Email Address** fields identify the e-mail addresses of the personnel to whom the FOX matrix switcher e-mails notification of its failure and repair status. Standard e-mail address conventions (*aaaaa@xxx*.com) apply.

The check boxes and drop boxes associated with each address field permit you to specify specific criteria under which the switcher will e-mail recipients.

- In the associated **Missing Input** drop boxes, select the inputs to monitor for presence or absence of a signal.
- Check the **Fans** and **Power** boxes to monitor the fans and power supplies.
- In the associated **Email Options** drop box, select whether the recipient is to be e-mailed of failures, fixes, both, not notified, or to be removed from the e-mail list. The **Suspend** option is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as when travelling or on vacation.
- Deleting an e-mail addressee and clicking the **Submit** button removes the recipient from e-mail notification completely.

SNMP Settings Page

NOTES:

- Simple Network Management Protocol (SNMP) is an internet-standard protocol for IT personnel to manage devices on an IP network. It is not the intent of this guide to define SNMP further than this and this section is intended for users who are familiar with SNMP protocol.
- The matrix switcher can report alarm events via an SNMP trap, providing simple integration with network management systems (NMS).
- When communicating using SNMP and generating SNMP traps (alarms and notifications), the matrix switcher complies with the requirements of SNMP v2c.
- **IT personnel** — Contact the S3 Sales & Technical Support Hotline to get all Extron-specific Management Information Base (MIBs). See the contact numbers on the **last page** of this guide for the Extron office nearest you.

Reach the SNMP Settings page (see figure 42) by clicking the **`SNMP Settings`** link on the System Settings page. The SNMP Settings page has fields for establishing the general SNMP settings and fields to establish SNMP monitoring and optional traps.

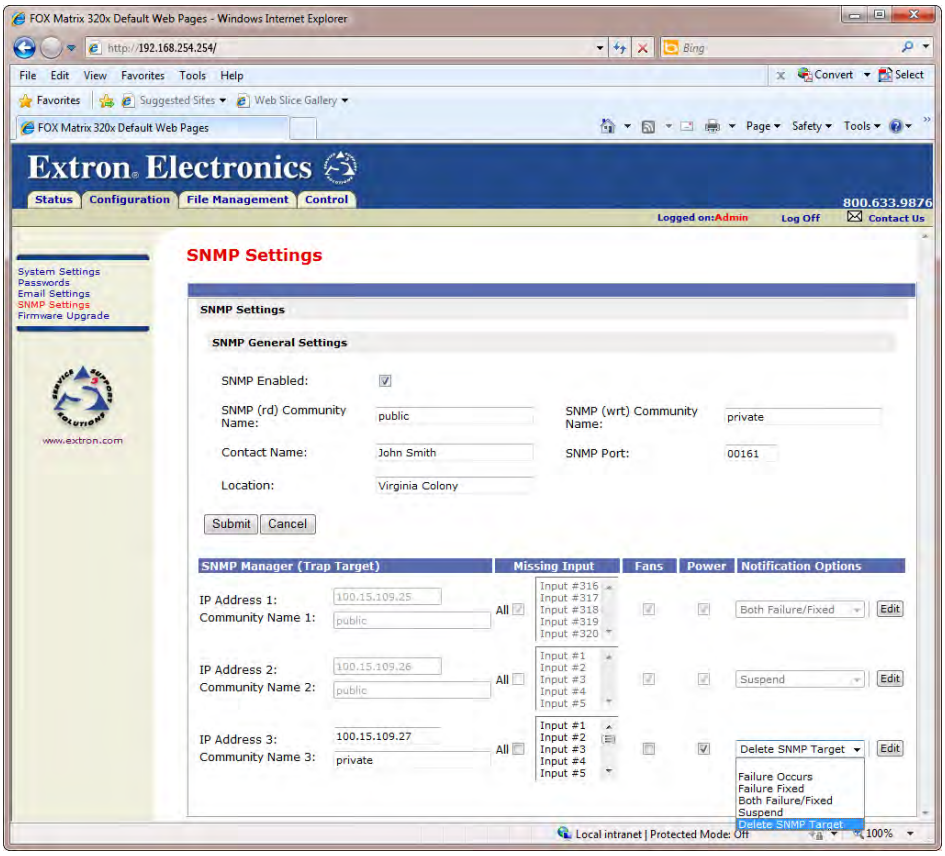


Figure 42. SNMP Settings Page

SNMP General Settings fields

To edit the SNMP General Settings fields, ensure that the **SNMP Enabled checkbox** is selected (SNMP is disabled by default). Click the **Submit** button to save all changes or the **Cancel** button to abandon changes.

SNMP Community Name fields — The two names are similar to passwords, granting public, read-only [SNMP (rd)] and private, read-write access [SNMP (wrt)] to the NMS. The default names are **public** and **private**.

Contact Name and Location fields — The two fields add optional information as to the location of the NMS. By default, Not Specified is assigned to the **Name** and **Location** fields.

SNMP Port field — This field identifies the port that the NMS uses to communicate with the switcher and should only be changed by IT personnel. The default port is 161.

SNMP Manager (Trap Target) fields

To edit each row of the SNMP Manager (Trap Target) settings, click the **Edit** button to make the fields available for editing. The button changes to **Save**. After editing the associated settings, click the **Save** button.

The three **IP Address** fields identify up to three NMS targets to receive trap notifications of the switcher failure and repair status or a mix of trap types to the same target.

The check boxes and drop boxes associated with each IP address field permit the operator to specify specific criteria under which the switcher sends trap notifications.

- In the associated **Missing Input** drop boxes, select the inputs to trap the presence or absence of a signal.
- Check the **Fans** and **Power** boxes to trap the fans and power supplies.
- In the associated **Notification Options** drop box, select whether to notify the target of failures, fixes, both, not notified, or to remove the target from trap list (select **Delete SNMP Target**). The **Suspend** option is useful for temporarily removing NMS stations from the notification list when they are unavailable.

Firmware Upgrade Page

The Firmware Upgrade (see figure 43) page provides another way to replace the firmware that is coded on the control board of the switcher without taking the switcher out of service. Access the page by clicking the **Firmware Upgrade** link on the System Settings page.

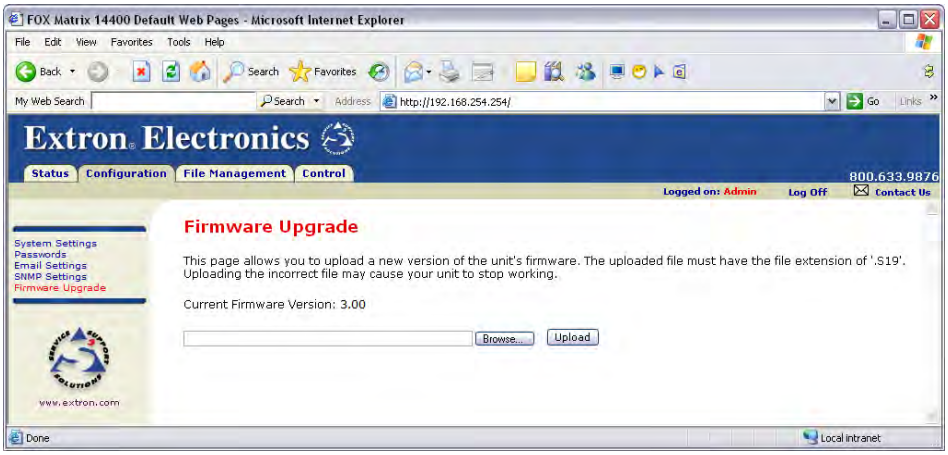


Figure 43. Firmware Upgrade Page

Update the switcher firmware as follows:

NOTE: The Firmware Upgrade page is only for replacing the firmware that controls all switcher operation. To insert your own custom HTML pages, see **File Management Page**, on page 71.

1. Perform steps 1 through 5 of **Installing the Software**, on page 38, to download the firmware upgrade from the Extron website.
2. Connect the PC to the FOX matrix switcher via the LAN port of the switcher.
3. Access the FOX matrix switcher using HTML pages.
4. Click the **Configuration** tab (see figure 44).

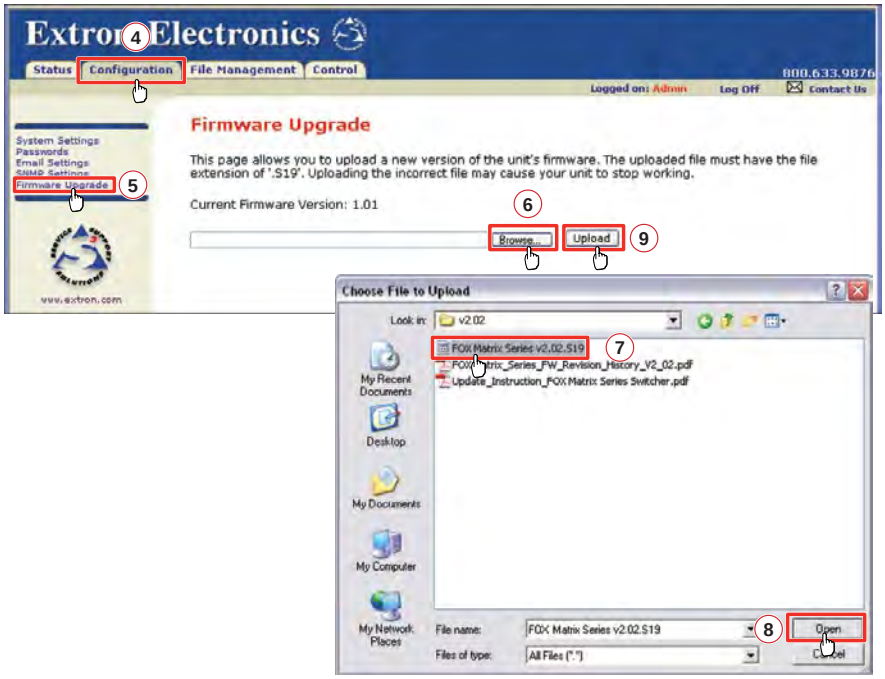


Figure 44. Firmware Upgrade

5. Click the **Firmware Upgrade** link (see **figure 44** on the previous page).
6. Click the **Browse** button. A Choose File to Upload dialog box appears.
7. Navigate to the folder where you saved the firmware upgrade file. Select the file.

ATTENTION: The firmware file must have an .s19 extension. Other file types can cause the switcher to stop functioning.

NOTES:

- When downloaded from the Extron website, the firmware is placed in a subfolder of:
  - **Windows 7 or Windows 8**: `C:\Program Files (x86)\Extron\Firmware`.
  - **Older versions**: `C:\Program Files\Extron\Firmware`.
- The original firmware is permanently available on the switcher. If the attempted firmware upload fails, the switcher reverts to the factory-installed firmware.

8. Click the **Open** button.
9. Click the **Upload** button. The firmware upload may take a few minutes.

File Management Tab

File Management Page

To delete files such as HTML pages from the switcher or to upload your own files to the switcher, click the **File Management** tab. The switcher downloads the File Management HTML page (see figure 45).

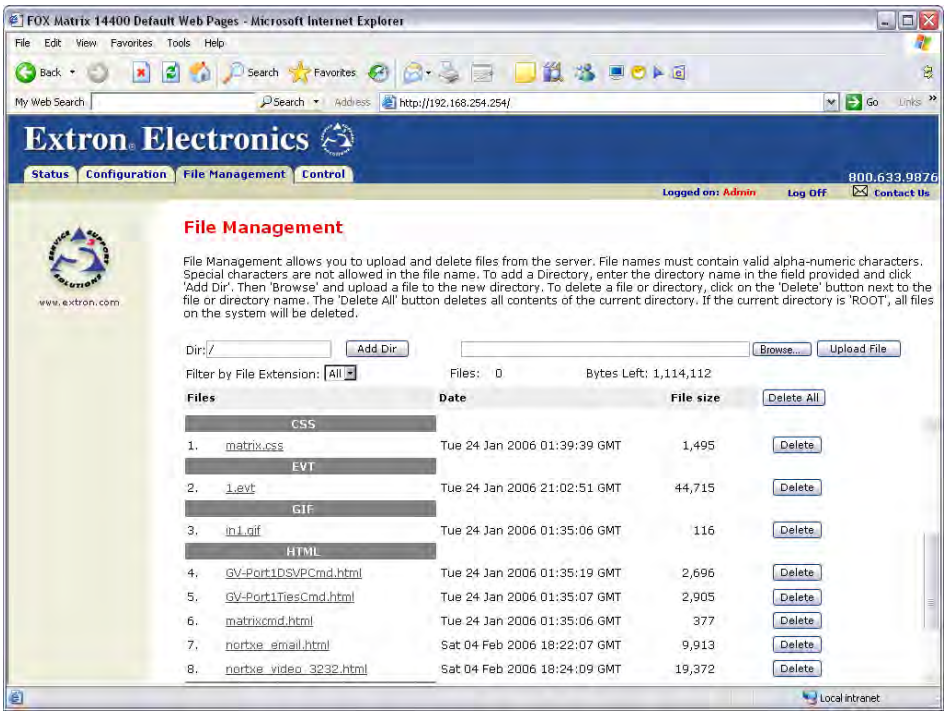

FOX Matrix 14400 Default Web Pages - Microsoft Internet Explorer
Extron Electronics
Status
Configuration
File Management
Control
800.633.9876
Logged on: Admin
Log Off
Contact Us
File Management
File Management allows you to upload and delete files from the server. File names must contain valid alpha-numeric characters. Special characters are not allowed in the file name. To add a Directory, enter the directory name in the field provided and click 'Add Dir'. Then 'Browse' and upload a file to the new directory. To delete a file or directory, click on the 'Delete' button next to the file or directory name. The 'Delete All' button deletes all contents of the current directory. If the current directory is 'ROOT', all files on the system will be deleted.
Dir: /
Add Dir
Browse...
Upload File
Filter by File Extension: All
Files: 0
Bytes Left: 1,114,112
Files
Date
File size
Delete All
CSS
1. matrix.css Tue 24 Jan 2006 01:39:39 GMT 1,495 Delete
EVT
2. 1.evt Tue 24 Jan 2006 21:02:51 GMT 44,715 Delete
GIF
3. in1.gif Tue 24 Jan 2006 01:35:06 GMT 116 Delete
HTML
4. GV-Port1DSVPCmd.html Tue 24 Jan 2006 01:35:19 GMT 2,696 Delete
5. GV-Port1TiesCmd.html Tue 24 Jan 2006 01:35:07 GMT 2,905 Delete
6. matrixcmd.html Tue 24 Jan 2006 01:35:06 GMT 377 Delete
7. nortxe_email.html Sat 04 Feb 2006 18:22:07 GMT 9,913 Delete
8. nortxe_video_3232.html Sat 04 Feb 2006 18:24:09 GMT 19,372 Delete
Local intranet

Figure 45. File Management Page

NOTE: Figure 45 is an example only. Files shown may not be present on your switcher.

To delete a file, click the **Delete** button associated with that file.

Upload your own files as follows:

NOTE: The HTML language reserves certain characters for specific functions (see **Special Characters** on page 35).

1. Click the **Browse** button.
2. Browse through your system and select the desired file or files.

   NOTE: If you want one of the pages that you create and upload to be the default startup page, name that file “index.html”.

3. Click the **Upload File** button. The file or files that you selected appear in the list.

Control Tab

Set and View Ties Page

You can create ties on the Set and View Ties page (see figure 46). Access the Set and View Ties page by clicking the **Control** tab.

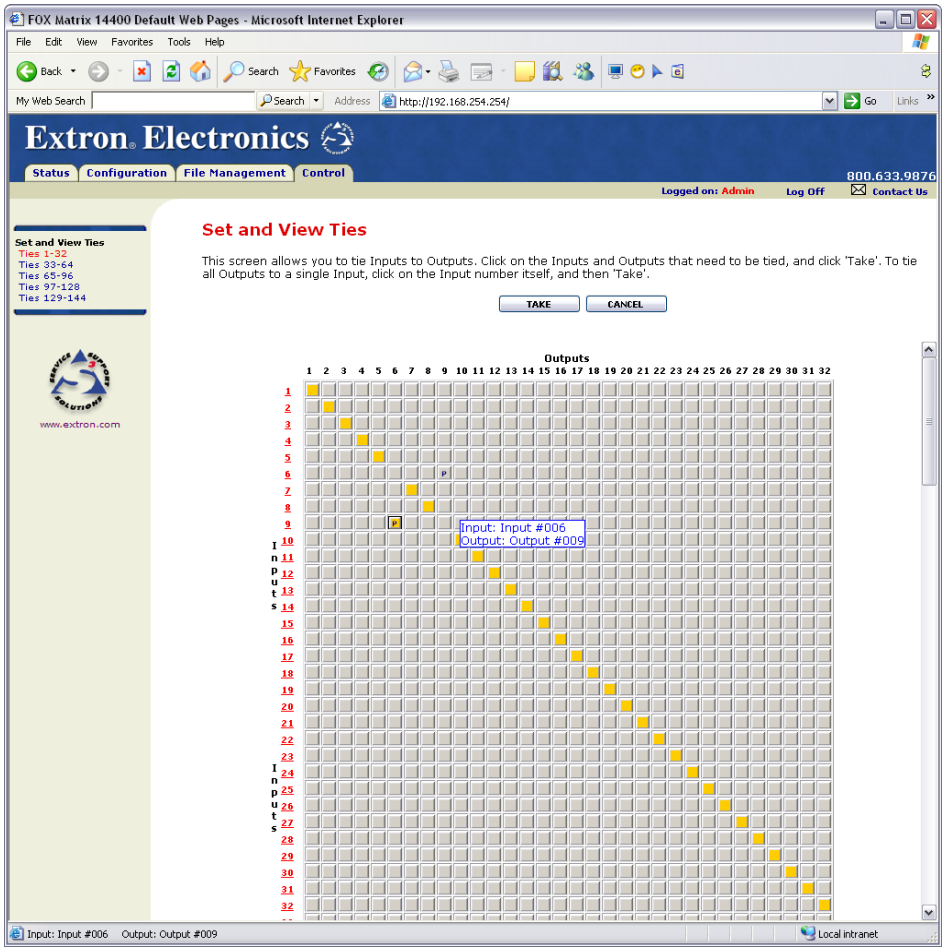


Figure 46. Set and View Ties Page

The page consists of a matrix of input (rows) and output (columns) buttons of two colors:

- The **amber** buttons indicate **ties**.
- The **gray** buttons indicate **no ties**.

TIP: If you lose track of the input and output associated with a specific button, let the mouse pointer rest over the button for a moment. As shown on **figure 46**, on the previous page, a field pops up that identifies the input and output numbers for that button.

Creating or deleting a tie

Make or break a tie as follows:

1. Move the mouse over the matrix of input and output selection buttons. Click a button to:
   - Create a pending tie (if a tie does not exist) of the input and output associated with that button.
   - Create a pending untie (if a tie exists) of the input and output associated with that button.

   A "P" (for pending) appears in the button.

   NOTES:
   - Because of command length limitations in the browser, you can make a maximum of 30 connections with a single **Take** command (step **2**).
   - To tie an input to all outputs, click the input number for that input.

2. Click the **Take** button to make the configuration changes or the **Cancel** button to abandon the configuration changes.

Maintenance and Modifications

This section covers corrective maintenance and modifying the FOX matrix switchers, including:

- **Mounting the Switcher**
- **Battery and Power Precautions**
- **Removing and Installing an I/O Board or Blank Panel**
- **Removing and Installing a Power Supply Module**
- **Removing and Installing a Fan Module**

ATTENTION: Installation and service must be performed by authorized personnel only.

Mounting the Switcher

The FOX Matrix 320x is housed in a rack-mountable, 17U high metal enclosure with mounting flanges for standard 19-inch wide racks. The FOX Matrix 14400 is in an 8U high enclosure. If desired, rack mount the switcher as follows:

UL Guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the matrix switcher into a rack.

- **Elevated operating ambient temperature —** If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature specified by Extron (Tma = +32 to +122 °F [0 to +50 °C]).
- **Reduced air flow —** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical loading —** Mount the equipment in the rack so that uneven mechanical loading does not create a hazardous condition.
- **Circuit overloading —** Consider the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Use appropriate consideration of equipment nameplate ratings when addressing this concern.
- **Reliable earthing (grounding) —** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Mounting Instructions

1. Insert the unit into the rack, aligning the mounting bracket holes with those in the rack.
2. Secure the switcher to the rack using the supplied bolts.

Battery and Power Precautions

The matrix switcher is provided with a permanently installed (factory-soldered in place) lithium battery. The battery maintains the real time clock in the event of power failure or extended storage periods and does not affect the normal operation of the switcher. If the battery becomes ineffective, return the switcher to Extron for repair.

WARNING: Explosion hazard — There is a danger of explosion if the battery is incorrectly replaced. Do not attempt to remove or replace the internal battery.

ATTENTION:

- This unit uses double pole/neutral fusing.
- Do not operate the equipment with only one power supply cord connected.

Removing and Installing an I/O Board or Blank Panel

WARNING: Risk of serious physical injury — The FOX matrix switchers fiber optic I/O boards output continuous invisible light, which may be harmful to the eyes; use with caution.

- **Do not look** into the fiber optic cable connectors or into the fiber optic cables themselves.
- Plug the attached dust caps into the optical transceivers when the fiber cable is unplugged.

Circuit boards can be replaced for fault correction. They can be added or removed to increase or decrease the I/O configuration (size) of the FOX Matrix switcher.

NOTES:

- As factory configured, the fiber optic I/O boards are either 100 percent singlemode or 100 percent multimode, but you can remove a fiber optic transceiver module (one input and one output) of one transmission mode and replace it with a module of the other transmission mode.

  You can mix transmission mode transceiver modules on a fiber optic I/O board, provided that you ensure that each fiber cable and connected devices are the appropriate transmission mode for the transceiver module. Typically, singlemode fiber cable has a yellow jacket and multimode cable has an orange or aqua jacket.
- For proper cooling and air flow, boards or blank panels should be installed in all locations during normal switcher operations.

As shown in figure 47, each I/O board is identified by the input and output numbers supported by the board position, which are printed on the side of each fan module (1 - 16, 17 - 32, and so on). The transceiver modules on fiber optic I/O boards are identified as A through P.

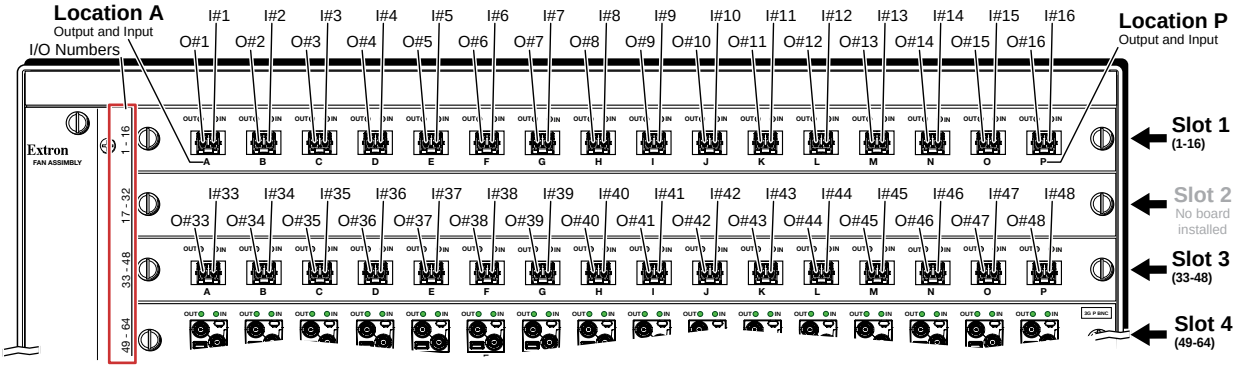

Location A
Output and Input
I/O Numbers
I#1 I#2 I#3 I#4 I#5 I#6 I#7 I#8 I#9 I#10 I#11 I#12 I#13 I#14 I#15 I#16
O#1 O#2 O#3 O#4 O#5 O#6 O#7 O#8 O#9 O#10 O#11 O#12 O#13 O#14 O#15 O#16
Location P
Output and Input
Extron
FAN ASSEMBLY
1 - 16
17 - 32
33 - 48
49 - 64
A B C D E F G H I J K L M N O P
Slot 1
(1-16)
Slot 2
No board
installed
Slot 3
(33-48)
Slot 4
(49-64)
I#33 I#34 I#35 I#36 I#37 I#38 I#39 I#40 I#41 I#42 I#43 I#44 I#45 I#46 I#47 I#48
O#33 O#34 O#35 O#36 O#37 O#38 O#39 O#40 O#41 O#42 O#43 O#44 O#45 O#46 O#47 O#48

Figure 47. Arrangement of Inputs and Outputs on the I/O Boards

Locations A through P correspond to the transceiver modules. Each module, numbered from left to right, includes one of the outputs and one of the inputs supported by the board. (For example, the input and output numbers supported by the I/O board in location 33 - 48 [slot 3] are as follows: A = 33, B = 34, C = 35, D = 36, E = 37, F = 38, G = 39, H = 40, I = 41, J = 42, K = 43, L = 44, M = 45, N = 46, O = 47, and P = 48.)

NOTE: The output on the transceiver module is to the *left* of the input.

Slot	Inputs and outputs	Slot	Inputs and outputs
1	1 through 16	11*	161 through 176
2	17 through 32	12*	177 through 192
3	33 through 48	13*	193 through 208
4	49 through 64	14*	209 through 224
5	65 through 80	15*	225 through 240
6	81 through 96	16*	241 through 256
7	97 through 112	17*	257 through 272
8	113 through 128	18*	273 through 288
9	129 through 144	19*	289 through 304
10*	145 through 160	20*	305 through 320

* FOX Matrix 320x only

ATTENTION: Do not touch the electronic components or the backplane or circuit board connectors without being electrically grounded. Handle circuit boards by their edges only. ESD can damage circuits, even if you cannot feel, see, or hear it.

NOTE: The I/O boards are hot-swappable. You do not need to power down the switcher to remove or install an I/O board.

Removing an I/O Board or Blank Panel

Remove an I/O board or blank panel as follows:

1. **For an I/O board**, disconnect any connected cables.
2. Rotate the left and right knurled knobs to completely loosen the screws.
3. Gently pull on the screws to loosen the board or panel from the backplane.
4. Slide the board or panel out of the chassis (see figure 48) and place it on an anti-static surface or in an anti-static container.

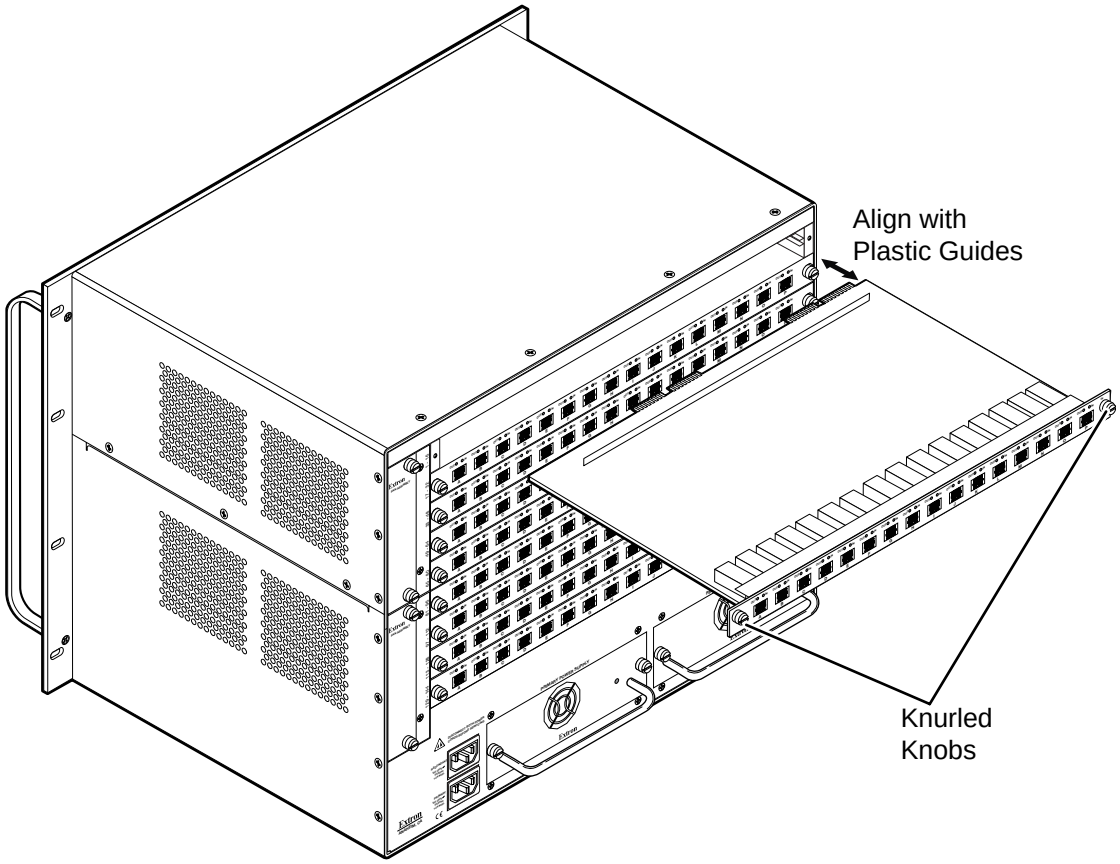


Figure 48. I/O Board Replacement

Installing an I/O Board or Blank Panel

Install an I/O board or blank panel as follows:

1. **For an I/O board**, orient the board to be installed so that transceiver module A (**fiber board**) or input BNC A (**SDI/HD-SDI board**) is on the left and transceiver module or output BNC P is on the right.
2. **For an I/O board,** align the board with the left and right chassis guides (see figure 48).
3. Gently slide the board or blank panel into the enclosure. **For an I/O board**, slide the board toward the front panel until it meets resistance.
4. Gently seat the board or panel in the backplane.
5. Use a screwdriver to tighten the left and right screws to secure the board or panel in place.

Removing and Installing a Power Supply Module

The power supply modules are identical. Each power supply module has a 2-color LED that indicates the status of the power supply outputs. If the LED is lit green, the power supply is operating normally. If the LED is lit red, the supply has failed and should be replaced at the earliest opportunity.

NOTE: The power supply modules are hot-swappable. Any power supply can be removed without powering down the switcher.

Removing a Power Supply Module

Remove a power supply module as follows:

1. Rotate the left and right knurled knobs to completely loosen the screws.
2. Gently pull on the handle to loosen the power supply from the backplane (see figure 49).

   NOTE: Figure 49 shows a FOX Matrix 14400. The FOX Matrix 320x is similar, but has four power supply modules that are vertically mounted.

3. Slide the power supply out of the chassis.

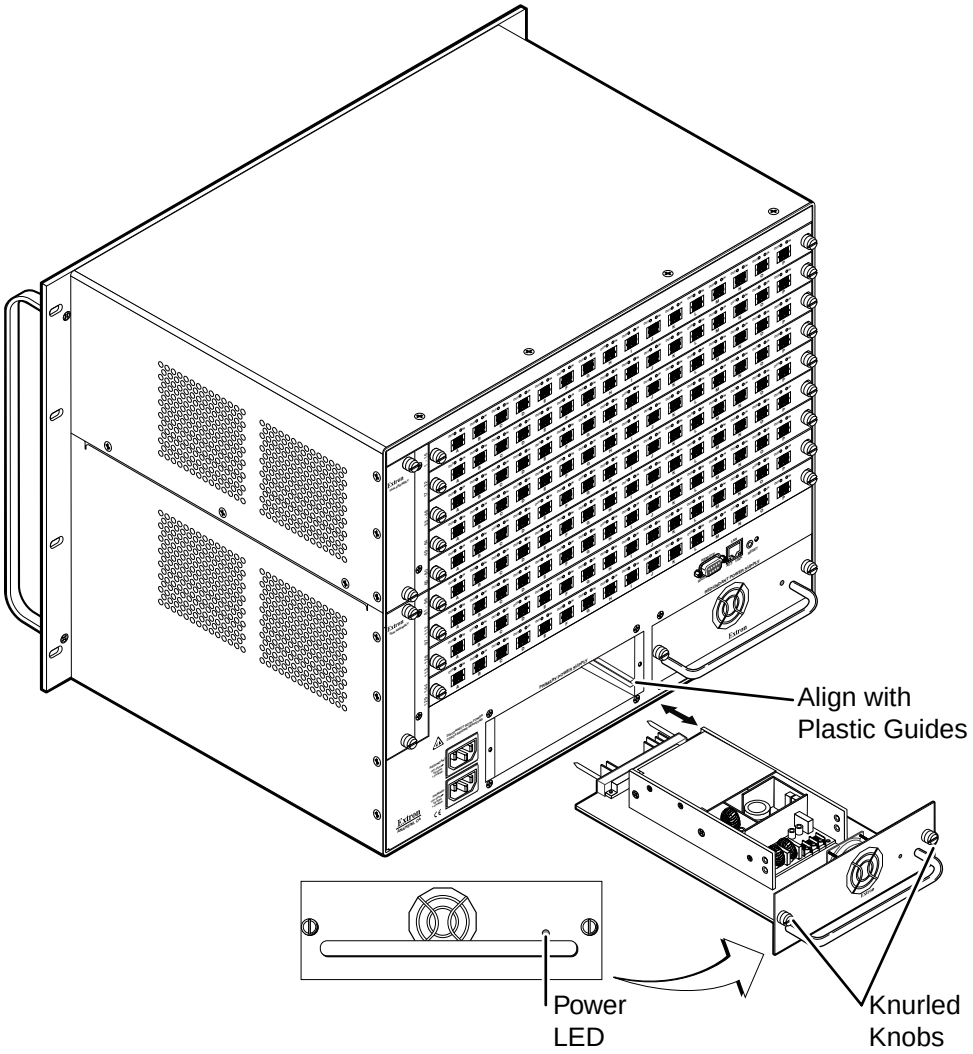


Figure 49. Power Supply Replacement, FOX Matrix 14400

Installing a Power Supply Module

NOTE: The power supply modules are hot-swappable. You do not need to power down the switcher to install a power supply.

Install a power supply module as follows:

1. Orient the power supply module to be installed with the LED to the right.
2. Align the flanges on the power supply module with the left and right power supply guides (see **figure 49**, on the previous page).
3. Gently slide the power supply module into the enclosure until the power supply meets resistance.
4. Gently seat the power supply in the backplane.
5. Use a screwdriver to tighten the left and right screws to secure the power supply in place.

Removing and Installing a Fan Module

The FOX Matrix 320x has four fan modules and the FOX Matrix 14400 has two fan modules. The fan modules for each model are identical. If a fan fails, it should be replaced at the earliest opportunity.

Removing a Fan Module

Remove a fan module as follows:

NOTE: The fans modules are hot-swappable. Either fan can be removed or installed without powering down the switcher.

1. Remove and retain the two screws that secure the row identification plate to the fan (see figure 50). Retain the plate.

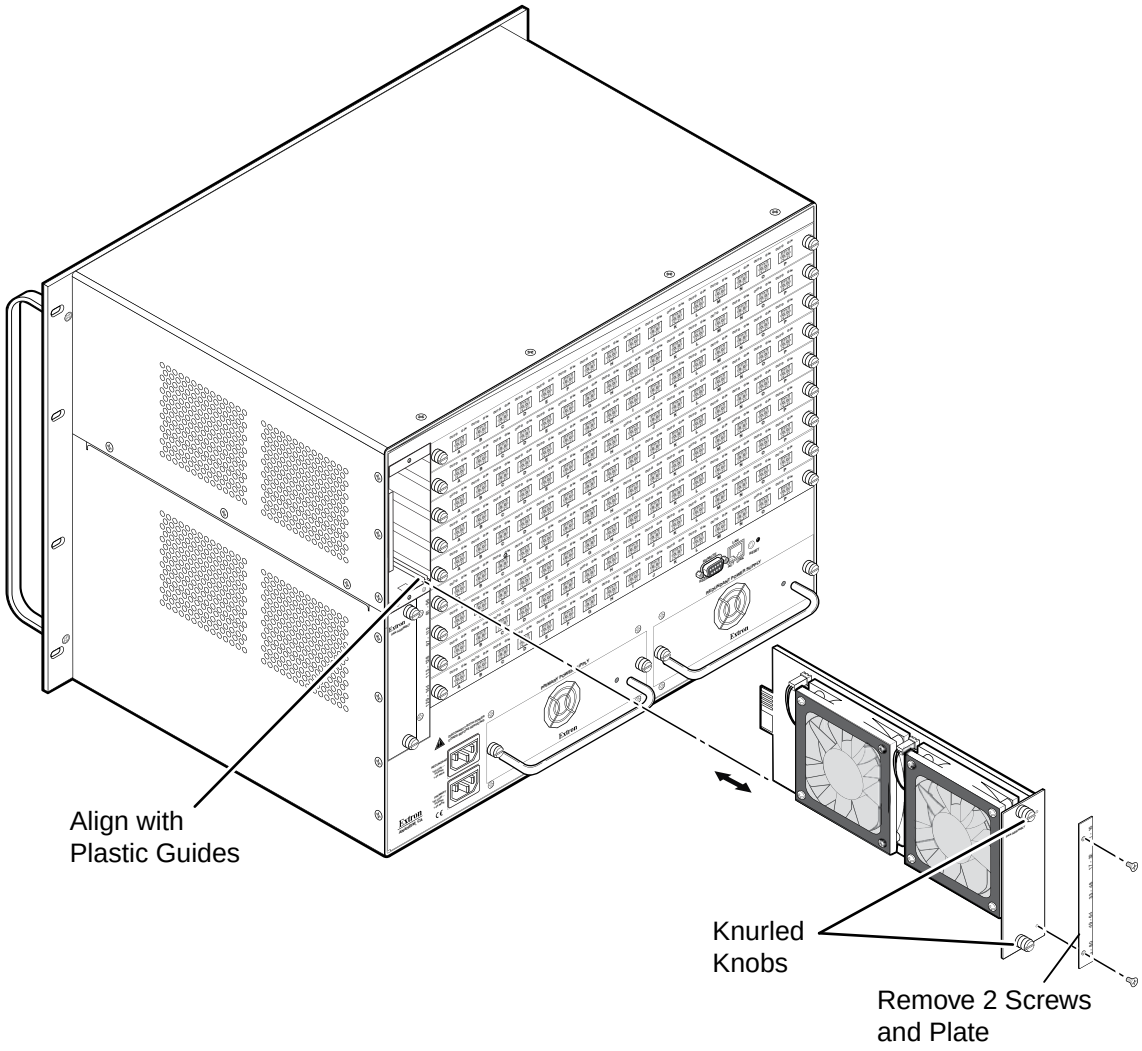


Figure 50. Fan Replacement

2. Rotate the top and bottom knurled knobs to completely loosen the captive screws.
3. Gently pull on the screws to loosen the fan from the backplane.
4. Slide the fan out of the chassis.

Installing a Fan Module

1. Orient the fan to be installed so that the printing on the back of the panel is rightside up.
2. Align the flanges on the fan with the top and bottom fan guides (see **figure 50**, on the previous page).
3. Gently slide the fan into the enclosure until the fan meets resistance.
4. Gently seat the fan in the backplane.
5. Use a screwdriver to tighten the top and bottom screws to secure the fan in place.
6. Secure the row identification plate to the fan.

Ethernet Connection

This section provides a high level discussion of the Ethernet connection to the switcher and a primer on the subject of subnetting. Topics that are covered, include:

- **Ethernet Link**
- **Subnetting — A Primer**

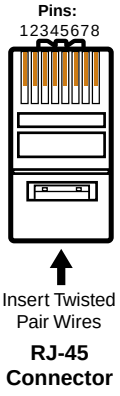
Ethernet Link

The rear panel Ethernet connector on the FOX matrix switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN.

Ethernet Connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (see figure 51).

- **Crossover cable** — Direct connection between the computer and the FOX matrix switcher
- **Patch (straight-through) cable** — Connection of the FOX matrix switcher to an Ethernet LAN



Crossover Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown
	T568A	T568B

A cable that is wired as T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

Straight-through Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-orange	White-orange
2	Orange	Orange
3	White-green	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Green	Green
7	White-brown	White-brown
8	Brown	Brown
	T568B	T568B

A cable that is wired the same at both ends is called a "straight-through" cable, because no pin/pair assignments are swapped.

Figure 51. RJ-45 Connector Pinout Tables

Default IP Address

To access the FOX matrix switcher via the LAN port, you need the IP address of the switcher. If the address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to the FOX matrix switcher.

Pinging to Determine the Extron IP Address

The ping utility is available at the **Command** prompt. Ping tests the Ethernet interface between the computer and the FOX matrix switcher. Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the switcher as follows:

1. On the Windows task bar, click on **Start** > **Run**.
2. At the **Open** prompt, type **command**.
3. Click the **OK** button.
4. At the **Command** prompt, type **ping** {*IP address*} and then press <Enter>. The computer returns a display similar to the one shown in figure 52.

   The line **Pinging ...** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 52. Typical Ping Response

Pinging to Determine the Web IP Address

The ping utility has a modifier, **-a**, that directs the command to return the web address rather than the numeric IP address.

At the **Command** prompt, type **ping -a** {*IP address*} and then press <Enter>. The return display is similar to the ping response shown in figure 52, except that when you specify the **-a** modifier, the line **Pinging mail...** reports the web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Configuring the Switcher for Network Use via the ARP Command

The ARP (address resolution protocol) command tells your computer to associate the MAC (media access control) address of the FOX matrix switcher with the assigned IP address. You must then use the ping utility to access the controller, at which point the IP address of the controller is reconfigured.

Use ARP to configure the IP address as follows:

1. Obtain a valid IP address for the FOX matrix switcher from your network administrator.
2. Obtain the MAC address (UID #) of the FOX matrix switcher from the label on its rear panel. The MAC address should have this format: 00-05-A6-*xx-xx-xx*.
3. If the FOX matrix switcher has never been configured and is still set for factory defaults, proceed to step 4. If not, perform a mode 4 system reset and then proceed to step 4. For detailed information on reset modes, see **Performing Soft System Resets (Resets 3, 4, and 5)** on page 19.

   NOTE: The FOX matrix switcher must be configured with the factory default IP address (192.168.254.254) before the ARP command is executed, as described below.

4. At the PC, access the `Command` prompt (see **Pinging to Determine the Extron IP Address**, on the previous page, steps 1 through 3), then enter the `arp –s` command. Type in the desired new IP address for the unit (obtained in step 1) and the MAC address of the unit (from the rear panel of the unit), for example, `arp –s 10.13.197.7 00-05-A6-03-69-B0` and then press <Enter>.

   The computer returns the command prompt (`C:\`).

   After you issue the `arp -s` command, the controller changes to the new address and starts responding to the ping requests to the new address, as described in the next step.

   NOTE: You must ping the FOX matrix switcher for the IP address change to take place. The response should show the new IP address, as shown in figure 53.

5. Execute a ping command by entering ping followed by a space and the new IP address at the command prompt. For example:

   `ping 10.13.197.7`

```
C:\>ping 10.13.197.7

Pinging 10.13.197.7 with 32 bytes of data:

Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128

Ping statistics for 10.13.197.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 53. Ping with New Address

NOTE: You can reconnect using either Telnet or a web browser to verify that the update was successful.

6. After verifying that the IP address change was successful, enter and issue the arp –d command at the Command prompt. For example:

   `arp –d 10.13.197.7` removes 10.13.197.7 from the ARP table

   or

   `arp –d*` removes all static IP addresses from the ARP table.

Connecting as a Telnet Client

The Microsoft Telnet utility is available from the **Command** prompt. Telnet allows you to input SIS commands to the FOX matrix switcher from the PC via the Ethernet link and the LAN.

Access the **Command** prompt and start Telnet as follows:

1. On the Windows task bar, click **Start** > **Run**.
2. At the **Open** prompt, type **command**.
3. Click the **OK** button.
4. At the **Command** prompt, type **Telnet** and then press <Enter>. The computer returns a display similar to the one shown in figure 54.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Figure 54. Telnet Window

Telnet Tips

It is not the intention of this guide to detail all of the operations and functionality of Telnet; however, some basic level of understanding is necessary for operating the FOX matrix switcher via Telnet.

Open

Connect to the FOX matrix switcher using the Open command. Once you are connected to the switcher, you can enter the SIS commands the same as you would if you were using the RS-232 or RS-422 link.

Connect to the FOX matrix switcher as follows:

1. At the `Telnet` prompt, type `open {IP address}` and then press <Enter>.

   If the switcher is not password protected, no further prompts are displayed until you break or disconnect the connection to the matrix switcher.

   If the switcher is password protected, Telnet displays the password prompt.

2. If necessary, at the password prompt, type the appropriate password and then press <Enter>.

   Connection to the switcher via the Ethernet can be password protected. There are two levels of password protection: administrator and user. A person logged on as an administrator has full access to all matrix switcher switching capabilities and editing functions. Users can create ties, set mutes, and view all settings with the exception of passwords. By default, the FOX matrix switcher is shipped with both passwords set to {*carriage return*}.

   Once you are logged in, the switcher returns either `Login Administrator` or `Login User`. No further prompts are displayed until you break or disconnect the connection to the FOX matrix switcher.

Escape character and Esc key

When Telnet is first started, the utility advises that the Escape character is 'Ctrl+]'. Many SIS commands include the keyboard <Esc> key. Consequently, some confusion may exist between the Escape character and the Escape key.

The Telnet Escape character is a key combination, the <Ctrl> key and the <]> key pressed simultaneously, which returns you to the `Telnet` prompt while leaving the connection to the FOX matrix switcher intact.

The Escape key is the <Esc> key on the computer keyboard.

Local echo

Once connected to the FOX matrix switcher, by default, Telnet does not display your keystrokes on the screen. SIS commands are typed in blindly and only the SIS responses are displayed on the screen. To command Telnet to show keystrokes, at the `Telnet` prompt, type `set local_echo` and then press <Enter> before you open the connection to the switcher.

With local echo turned on, keystrokes and the responses of the switcher are displayed on the same line. For example: `1*1!In1 Out1 All`, where `1*1!` is the SIS command and `In1 Out1 All` is the response.

With local echo turned on, all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as `a*d*m*i*n*`, where `admin` is the keyed in password and `*****` is the masked response.

You can turn off local echo by typing `unset local_echo` and then pressing <Enter> at the Telnet prompt. If you are connected to the FOX matrix switcher and need to access the Telnet prompt to turn local echo off, type the Escape character (<Ctrl>+<]>).

Set carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected switcher when you press the <Enter> key. This is the correct setting for SIS communication with the switcher. The Telnet `set crlf` command forces Telnet to transmit carriage return and line feed characters when <Enter> is pressed, but if crlf is set, the SIS link with the switcher does not function properly.

Close

To close the link to the switcher, access the `Telnet` prompt by typing the Escape character (<Ctrl>+<]>). At the Telnet prompt, type close, and then press <Enter>.

Help

For Telnet command definitions, at the `Telnet` prompt, type `?` and then press <Enter>.

Quit

Exit the Telnet utility by typing `quit` and then pressing <Enter> at the `Telnet` prompt. If you are connected to the FOX matrix switcher, access the `Telnet` prompt by typing the Escape character (<Ctrl>+<]>).

Subnetting — A Primer

It is not the purpose of this guide to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting (a subnet is a subset of a network — a set of IP devices that have portions of their IP addresses in common) is necessary in order to understand the interaction of the FOX matrix switcher and the mail server gateway. To understand subnetting at the level required to install and operate the FOX matrix switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

The FOX matrix switcher can communicate with the e-mail server that the switcher uses for e-mail notification directly (if they are on the same subnet) or the communication can be routed via a gateway (a computer that provides a link between different subnets).

Local and Remote Devices

The local and remote devices are defined from the point of view of the function being described. In this guide, subnetting is an issue when you are using the controlling PC to set TCP/IP and e-mail values in the matrix switcher (see **IP Settings/Options Window** on page 43 and **Email Settings Page** on page 66). When you are setting up the variables for e-mail notification, which may include subnetting, the matrix switcher is the local device and the e-mail server is the remote device.

IP Addresses and Octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called "octets," separated by dots (periods) (see figure 55). Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Values of 256 and above are invalid.

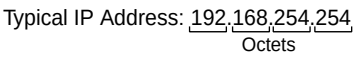


Figure 55. Typical IP Address

Subnet Masks and Octets

The subnet mask (see figure 56) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

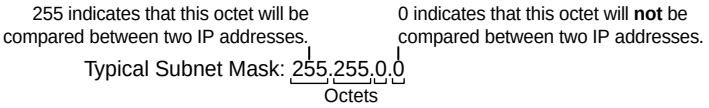

255 indicates that this octet will be compared between two IP addresses.
0 indicates that this octet will not be compared between two IP addresses.
Typical Subnet Mask: 255.255.0.0
Octets

Figure 56. Typical Subnet Mask

Determining Whether Devices Are on the Same Subnet

To determine the subnet, the IP address of the local device is compared to the IP address of the remote device (see figure 57). The octets of each address are compared or not compared, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the IP addresses of the local device and the remote device are unmasked.

  Unmasked octets are compared (indicated by ? in figure 57).

- If the subnet mask octet contains the value 0, the related octets of the IP addresses of the local device and remote device are masked.

  Masked octets are not compared (indicated by X in figure 57).

If the unmasked octets of the two IP addresses **match** (indicated by = in figure 57, example 1), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by ≠ in figure 57, example 2 and example 3), the addresses **are not on the same subnet**.

	Example 1	Example 2	Example 3
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 (?.?.X.X)	255.255.0.0 (?.?.X.X)	255.255.0.0 (?.?.X.X)
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	=.=.X.X — Match (Same subnet)	≠.≠.X.X — No match (Different subnet)	=.≠.X.X — No match (Different subnet)

Figure 57. Comparing the IP Addresses of the Local and Remote Devices

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Chiyoda-ku, Tokyo 102-0082
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The Netherlands

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China

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Singapore

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Japan: 81.3.3511.7655

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